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**Report on USSR Academy of Sciences 1990
Annual Meeting**

Role of Science in Revival of Society

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[Report by A. Pokrovskiy on speeches of Vice Presidents of the USSR Academy of Sciences Academicians V. Kudryavtsev, K. Frolov, O. Nefedov, and V. Koptyug at the session of the Annual General Assembly of the USSR Academy of Sciences on 21 March 1990: "The Role of Science in the Renewal of Society"; first paragraph is *PRAVDA* introduction; report by V. Gubarev and I. Mosin on speeches of participants in the Annual General Assembly of the USSR Academy of Sciences: "Science and Reforms"; first paragraph is *PRAVDA* introduction]

[22 Mar 90, pp 1-2]

[Text] Yesterday the discussion of the reports continued at the Annual General Assembly of the USSR Academy of Sciences. As has already been reported in *PRAVDA*, this time four more reports of vice presidents of the USSR Academy of Sciences on different fields of knowledge, but with a common theme—the role of science in the renewal of society—were submitted for discussion to the members of the academy. Today we are publishing summaries of them.

Academician V. Kudryavtsev

All the sciences—the natural and technical sciences and the humanities—are participating to a greater or smaller degree in the renewal of our society. I will speak only about the social, humanities fields of knowledge. And in this connection it must be declared bluntly: No positive influence on the process of perestroika and the renewal of society can be realized, if the resolute reappraisal of values, the revision of former notions in the socialist sciences themselves, and the change of the content and methods of the work of scientists have not occurred. It is impossible to promote the progress of society while holding outdated positions and adhering to old dogmas and stereotypes. How is the process taking place in practice?

The main thing, of course, is the transformation of social science from a tool of agitation and propaganda into a genuine science. Much is required for this. First of all, the resolute updating of methodology, the elimination of dogmatism and scholasticism, the revision of the interrelations of science with ideology and political practice, the abandonment of the thoughtless and uncritical quotation of the classics and commenting on socioeconomic and political decisions that are being made.

Science is incompatible with a "religious" attitude toward the works of its founders. When studying Marxist heritage, one should differentiate what played its role during specific periods of history, what remained

hypothesis, what was distorted and vulgarized in years past, and what today continues to have an effect and is of positive, creative significance.

It is necessary to put a complete end to the claims of the social disciplines to the truth and to the sermons addressed to other fields of knowledge. And in social science itself it is necessary to eliminate monopolism, be it methodology, the theory of cognition, or specific conclusions in different disciplines. The path to the truth is varied, and world achievements in the area of economic thought, political science, sociology, psychology, artistic culture, and so on do not become deficient and inapplicable for us, if they have been obtained by methods that are distinct from Marxist methods. We should acquire the wealth of knowledge, which is characteristic of mankind, and attain the world level of science and culture.

The quite excruciating, but generally reassuring process of perestroika is now occurring in this area. As an illustration it is possible to cite the works of our historians, who, perhaps, were criticized most strongly of all in recent times. The primary thing in the changes that are occurring is initially the timid, circumspect, but, in recent times, more resolute and bold elimination of stereotypes of evaluations and dogmatism in thinking and the gradual instilling in the psychology of scientists of the pluralism of approaches and solutions, without fear for their personal fates.

The attention to man in general is closely connected with the reassessment of the man-society-state relationship. This reassessment is a painful process, because it is necessary to do away with the tradition, in accordance with which everything was viewed through the prism of administrative command methods of management. Now the priority of human values, such as humanism, mercy, good, and social justice, is gradually being restored. This is leaving a more and more noticeable mark on the work of philosophers, psychologists, sociologists, and lawyers.

The same or similar processes are also occurring in other social sciences—economics, literary criticism, linguistics, and so on. The revision of former stereotypes and the turn toward new knowledge are impossible without two conditions: the revival of our entire cultural heritage, which for long years has been inaccessible not only for the reader at large, but also for specialists, and the mastering of all the wealth of world science and culture. Reassuring changes are also occurring here.

It is clear that in the end the quantitative accumulation of knowledge should lead to new quality—a more thorough understanding of the laws of social life—and, consequently, to the broadening of the opportunities to influence this life in a progressive direction.

If we examine the role of social scientists in accomplishing the tasks now facing our country, it is possible to state two things: first, the noticeable aspiration of scientists to aid the process of renewal and to apply their

knowledge and skill to practical work and, second, the thus far low effectiveness of these efforts.

First about the former. I am not speaking about the fact that quite recently a number of scientists held important state and public posts: There are Academicians L.I. Abalkin, Ye.M. Primakov, and I.T. Frolov, Corresponding Members of the USSR Academy of Sciences S.S. Alekseyev and N.Ya. Petrakov, and others. It is also necessary to speak about the scientists who have been elected USSR people's deputies. All of them can now directly and indirectly influence the real processes of economic, political, and spiritual life, by checking their views in practice. But positive changes have also occurred in the institutional unit of academic science. Perhaps, they are most appreciable among economists. Practically all the institutes of the Economics Department of the USSR Academy of Sciences, just as the institutes of economics of the union republics, actively participated in drafting the basic documents of economic reform.

In our times, when public opinion has acquired previously unprecedented influence, scientific journalism is of great importance. At first social scientists lagged greatly behind journalists, writers, and figures of culture in the prompt coverage in the press and other mass media of the problems that worry society. By 1989 this situation had begun to improve. Our scientists are not waiting for their monographs to be published, but are addressing the broadest audience far more boldly and more often.

It seems that we need to increase in every possible way the authority and prestige of science, to win this authority by deed, by revealing the objective laws of social life with all its contradictions, and thereby to contribute to the formulation of the most sound and promising state decisions.

Academician K. Frolov

We now need the constant scientific analysis of the processes of perestroika, especially economic reform and its connection with the transformation of the political system. The existing isolation of the technical, social, and economic sciences, apparently, is one of the significant hindering factors in the way of the development of an effective economic mechanism.

It must be acknowledged that the USSR Academy of Sciences thus far has not completely implemented the decisions of the 27th CPSU Congress on the strengthening of the technical orientation of scientific research. True, in recent years immense work was done along the lines of the Problems of Machine Building, Mechanics, and Control Processes Department, the Information Science, Computer Technology, and Automation Department, and the Physical Technical Problems of Power Engineering Department, new scientific centers for the development of the technical sciences were established in the Far East, the Urals, and the Volga River Region. Nevertheless, all these efforts for the present

cannot make up for the harm that was done to the USSR Academy of Sciences by the withdrawal of many institutes of the technical type from the academy.

Thus far we have also not overcome monopolism in science and technical progress. For the present we have insufficiently competitive rivalry. The restructuring of state scientific and technical policy should be aimed at the extension of democracy in science and the support of the self-management and independence of scientific collectives.

At the same time it is necessary to approach more responsibly the choice of priority directions. In this connection it is very important to intensify the work on the forecasting of the development of science and technology and the objective estimation of their needs and capabilities; on the consideration of the results and consequences of the use of innovations. Here not only the analytical side of the matter, but also extensive public discussion are important.

In connection with this it must be said that television, radio, and movies are practically not popularizing our scientific and scientific and technical achievements. Meanwhile, industry is unreceptive to innovations often due to the lack of information.

In recent years the greatest accidents and catastrophes have occurred in the USSR and abroad: the Chernobyl Nuclear Power Plant, the Three Mile Island Nuclear Power Plant (the United States), the Challenger, the product pipeline in Ufa, chemical plants in Bhopal (India) and Frankfurt am Main (the FRG), on railroads, air routes, and shipping lanes. Their evaluation showed that traditional scientific, engineering, and technical solutions have become inadequate for the prevention of accidents and catastrophes. These problems are problems of the age and have not so much scientific and technical as social and economic aspects.

With the theory of safety it is necessary to introduce the classification of accidents and catastrophes, bearing in mind their local, regional, national, and global consequences. It is necessary to make a theoretical and experimental analysis of the physical mechanical development of emergency situations under extreme conditions.

There is also the need to look more closely at such a leading field of science and technology as astronautics, which is beginning to lose its priority place in the country as a motive force of scientific and technical progress.

In the space fields the same crisis phenomena, which have affected other fields, are being observed. Development is often performed in a fragmentary manner, without economic and commercial substantiation, and without its comprehensive study and coordination over the entire life cycle of items. Efficient economic mechanisms, which stimulate the transfer of aerospace technologies to the national economy, are lacking.

The development of the global satellite system of navigation and air traffic control in conformity with an agreement between the USSR and the United States can serve as an indication of the benefit from large-scale international space cooperation. Of the major international projects the work on the development of the new generation Molniya aerospace system with horizontal launching based on the AN-225 aircraft as the first stage is of considerable interest. The system makes it possible to reduce by a factor of 10 the cost of the placement of payloads into orbit.

Unfortunately, for the present there are few such examples and it must be stated that the situation with international collaboration and cooperation is poor. I believe that a broad, long-range national program of work in the area of space should be developed in the USSR.

It is worthwhile to assign the choice of goals and decision making to an independent, extradepartmental public commission of experts, the results of which should be discussed in the press.

Based on what has been said, it seems necessary that the Interkosmos Council of the USSR Academy of Sciences should be reinforced and radically reorganized. It has to become the organizational and scientific methods center for the uniting of scientific collectives of the country in the area of space research. The clear breakdown of duties between the Interkosmos Council and the USSR Main Administration for the Development and Utilization of Space Technology not on the basis of unmanned or manned flights, but by directions is necessary.

And there is another phenomenon that is alarming. Many of our young talented scientists and specialists are going abroad and are leaving their best ideas there. In connection with this I would like to focus attention on the need to establish at our major centers more favorable conditions for the life, living, labor, and relaxation for foreign scientists and specialists who come to the Soviet Union. Then we will be able to establish a system of the mutual exchange of ideas in science.

In conclusion I would like to say that the problem of conversion has been quite correctly emphasized here. It seems to me that this is one of the most complex questions that are now being worked on in our country. It merits a special conference being organized for its discussion.

Academician O. Nefedov

It is well known that without chemistry and chemical processes and products no works and no sector of a modern economy and social sphere can exist. And in this connection it is necessary once again to direct attention to the alarming situation with the development of chemistry in our country and to the obvious underestimation of the role of chemicalization in the increase of the efficiency of the economy as a whole and in the accomplishment of the tasks of the restructuring of our society

and the substantial improvement of the economic situation in the country. The situation is being aggravated by the mass closing of chemical enterprises and by serious obstacles in the way of the building of new works.

At the same time the experience of leading and even many developing countries of the world convinces us that only advanced chemical materials and processes can provide an effective means of solving the complicated problems of ecology and health care, resource and energy conservation, of fulfilling the food and housing programs, and of saturating the market with goods.

It is clear that it is possible to achieve a substantial increase of the growth rate of the output of chemical products with the simultaneous sharp decrease of the volumes of harmful chemical discharges only by the comprehensive introduction of the achievements of modern chemical science, the development of fundamentally new products and technologies, and the radical modernization and renovation of operating works. In turn, this also requires the priority financial and resource supply of chemistry, which, unfortunately, we have not managed to achieve.

The work on radiochemistry is of particular importance in connection with the study and elimination of the consequences of the Chernobyl accident, with the ambiguous attitude toward the development of nuclear power engineering, and with various aspects of nuclear disarmament and conversion. The Actinides-89 International Conference, which was held in September of last year in Tashkent and in which scientists from 26 countries of the world participated, as well as the recent international conference on extraction in Moscow confirmed the rapid development of radiochemistry in the West and simultaneously the high level of radiochemical research in our country. It should be seen to that owing to the understandable radiophobia we would not lose leading positions in the area of theoretical and applied radiochemistry.

In the area of environmental radioactivity basic attention has been devoted to research that is aimed at the elimination of the consequences of the accident at the Chernobyl Nuclear Power Plant. Highly sensitive methods of detecting neptunium in the soil and americium in solutions have been developed, the laws of the distribution and migration of radionuclides in the ground of the 30-kilometer zone, their contamination of the air, and their fallout to earth were studied, and the optimum techniques of decontaminating various environments and objects were developed.

The research of the Termosintez Interbranch Scientific Technical Complex and its head Institute of Structural Macrokinetics is of fundamental importance for the creation of new materials and the development of waste-free ecologically clean methods of obtaining them. This research is based on the processes, which were discovered by our scientists, of self-propagating high-temperature synthesis—a special type of oxygen-free

combustion of solids. Basing themselves on the results of basic research, the authors proposed and implemented fundamentally new highly productive processes of obtaining highly pure boron nitride, ferroalloys, superconducting ceramics, new materials with shape recollection for medical purposes, superhard materials, refractories, and other substances with useful properties.

The serious situation, which has formed in our country with the supply of the population with drugs, is well known. The situation is being aggravated by the closing of many enterprises and the reduction of imports. In this connection the research in the area of fine organic synthesis, which is aimed at the finding of new drugs and the modification and improvement of the methods of obtaining known ones, is acquiring particular importance. Unfortunately, in the area of the development and introduction of original drugs we lag greatly behind the leading countries. The reason for this is the unsatisfactory organization of primary tests of synthesized substances, the inadequate attention to basic work in the area of chemical bioregulators, and the weakness of our pharmaceutical industry.

Nevertheless, during the year under review the institutes of the organic chemistry type with the effective support of the State Committee for Science and Technology successfully conducted research on the development and introduction of original methods of the synthesis of the strongest fourth-generation antibiotics, a number of important preparations for medicine and veterinary science (prostaglandins, levuglandins, leukotrienes), and a number of natural polyphenols and their derivatives, which have a high immunostimulating, antipyretic, and anti-inflammatory activity.

Interesting results were obtained in the area of the search for new drugs among organometallic compounds. Thus, the high biological activity of a number of compounds of metals of the platinum group was discovered at the Institute of General and Inorganic Chemistry. Two such preparations—efazol and cycloplatam, which have radioprotector and antitumor properties, have successfully undergone clinical or preclinical tests.

The role of chemistry in solving the problems of the development of the agroindustrial complex is enormous and diverse—these are the protection of agricultural plants and animals against weeds, pests, and diseases, the problems of increasing the yield and efficiency of agriculture, the increase of the keeping capacity of the harvested crop, and the optimization of the processing and the more complete use of agricultural raw materials. Here the ecological aspects of the chemicalization of agriculture were extremely important.

Unfortunately, the basic causes of the negative ecological and health consequences of the use of fertilizers and pesticides in plant growing are their obviously inadequate and obsolete assortment, with high rates of consumption, the low technical and agrochemical level of

the use of these chemical agents, and the lack of well-defined and effective economic stimuli and legal norms.

At one time the chemical institutes of the union and republic academies made an attempt to change substantially for the better the situation in this area of fine organic synthesis. However, the majority of academic developments were never implemented by domestic industry.

The use of advanced chemical, physical chemical, and biochemical methods in the processes of the processing of agricultural raw materials and the reclaiming of the waste products of agriculture and the fishing and food industry is affording enormous opportunities in the accomplishment of the food program. However, although in many basic directions of modern nutrition we hold a leading position in the world, in the area of technological developments and their introduction we have fallen behind the leading countries. The establishment of a number of corresponding laboratories, as well as the Novyye pishchevyye tekhnologii Interbranch Scientific Technical Complex is inspiring hope for progress in this area.

During the year under review the elaboration as a separate block of the academywide ecology program of the direction "Chemical Problems of Ecology" was completed. This block includes studies of the chemical and physical chemical processes in the environment, the formulation of the scientific principles of waste-free and low-waste technologies, and the development of effective methods and processes of the neutralization and reclaiming of chemical waste products and discharges and reliable methods and instruments of the analytical control and monitoring of the environment. Moreover, the formulation for 1990-1995 of the all-union program "The Development of the Scientific Principles of the Safety and Stability of Chemical Works" is being completed with the participation of the Academy of Sciences and our chemical institutes. Finally, the development of the State Ecology Program, in which the extensive participation of academic science, including chemical science, is anticipated, is also approaching completion.

Academician V. Koptyug

The improvement of the health and the radical modernization of industry and agriculture and of the economy as a whole are impossible without reliance on the latest achievements of science and without the acceleration of scientific and technical progress. At the same time the increase of the demand for them is governed by the state of the economic environment and by the economic interest of all social production in the assimilation of what is new. Today, as before, there is no such interest. A society with a large economy, like a sick man, does not care about the bright future—the main concern is to lower the temperature today. Hence the increasing pragmatic nature of the attitude toward science, the decline of the prestige of knowledge in society, which is accompanied by the growth of mysticism and the belief in

miracles, and the "brain drain" threatening our science as a result of the transfer to other spheres of activity both within the country and abroad.

Therefore, when discussing the question of the role of science in the renewal of society, it is necessary to bear in mind two aspects—how to preserve and try to develop the system of obtaining new knowledge during the transition period that is being gone through and how at the same time to increase its role in the life of society.

As chairman of the Siberian Department of the USSR Academy of Sciences I want to touch upon several aspects of the regional development of science and the problems connected with them. The excessive territorial centralization of academic science in our country, which had specific historical roots, is gradually being overcome. The establishment of the Siberian, and then the Ural and Far Eastern departments and the formation of a number of scientific centers were important steps in the direction of the spread of academic science over the territory of the Russian Federation. The importance of this line at present is growing in connection with the increase of the independence of the economic regions and the union republics themselves. Therefore, the territorial development of academic science henceforth should also be at the center of attention of the Presidium of the USSR Academy of Sciences.

But, in speaking about the decentralization of the location and management of science as a whole, I would like to recall a serious danger that lies in wait in this direction. I have in mind the danger of the gradual curtailing of basic research under the pressure of local interests, which make it incumbent to find quick solutions to today's problems.

It is possible to resist such pressure only within a specific integrated system—the scientific center or regional department. For this and a number of other reasons the decentralization of the management of science, which is being implemented at present, should have definite limits.

The Siberian Department of the USSR Academy of Sciences, in spite of the existing serious financial problems, for the present is still maintaining, although with much difficulty, an appreciable share of the basic research. But the situation is becoming critical—especially for institutes of the mathematics and mechanics direction and the physics direction.

It disturbs us that the attention to space research, and especially to the problems of solar-earth physics, is weakening. We are experiencing similar anxiety with respect to basic research in the area of the earth sciences, which are laying the foundations of the increase of the mineral raw material potential. It is paradoxical that in our country, which lives to a significant degree by means of raw material resources, the problems of global and regional geology today have not been grouped among the priority problems.

And all the same the basic research, which is being performed by the collectives of the Siberian Department of the USSR Academy of Sciences, is being conducted at far from a "provincial" level. The main thing that I want to note is that without a significant reserve in the area of basic research we would not be able to effectively participate in the solution of regional problems. All the experience of the work of the department, which is devoting much effort to the solution of practical problems, confirms again and again the old truth—there is nothing more practical than a good theory.

Our Siberia Comprehensive Regional Program of Scientific Research, which is oriented toward the needs of the region, relies on a reserve of basic research results, which is constantly replenished. At the last applied science conference the representatives of the Siberian Department of the USSR Academy of Sciences defended the point of view that basic research should be provided mainly with base, not short-term competitive, financing. The right of institutes to existence and to the conducting of basic research, not the annual search for assets for their maintenance, should be competitive.

I will recall that several years ago the Siberian Department of the USSR Academy of Sciences came forth with the initiative of certifying basic enterprises so as, by relying on the obtained data, to bring them up to the level of world analogs in the specific indicators of emissions. Prototypes of passports were drawn up for a large number of types of industrial enterprises—in particular, for the Krasnoyarsk Aluminum Plant, the Krasnoyarsk Plant of Medical Preparations, the Novosibirsk Tin Combine and the Chernorechenskiy Cement Plant, the Baykalsk Pulp and Paper Combine and the Seleninsk Pulp and Cardboard Combine, and others.

[23 Mar 90, pp 1-2]

[Text] The Annual General Assembly of the USSR Academy of Sciences is continuing its work. A pointed, principled discussion on the situation in domestic science, on the means of its development, and on the overcoming of the critical conditions, which have emerged in a number of areas, is taking place. We are publishing fragments from the statements of scientists and representatives of the public.

Academician A. Bayev

The system of the financing of basic science needs at present to combine base and goal program financing.

But goal programs do not exhaust all the conditions of the development of basic science. And first of all because they support only a limited number of studies.

Meanwhile, by its nature one vital peculiarity is characteristic of basic science—new directions emerge in an unpredictable manner from an amorphous mass of research which is not qualified at first as priority research. A classical example is the works of Mendel,

which were published in 1865. Only 35 years later did they become the basis of genetics.

Hence it follows that basic research should be conducted, first, on the broadest front, and by no means according to the principle of priority. It is necessary to provide it with base financing. Financing in accordance with goal programs should be regarded as supplementary to base financing, which is intended for the speeding up of the pace of research and the increase of its effectiveness.

The conditions of the financing of the basic and applied sciences and experimental design development cannot be identical. They should correspond to the peculiarities of these three types of activity. Financing should provide a normal working climate at organizations, which are engaged in basic research, and eliminate the need to seek money and worry about tomorrow, because the psychological frame of mind of the collective is of decisive importance for the success of scientific creativity.

Academician B. Paton

The question of the need for the renewal of the Academy of Sciences has been raised by life itself. The Academy of Sciences can act in the new capacity only when it becomes in practice an independent, autonomous public organization, which unites the most prominent scientists and develops in accordance with the laws of its own internal logic under the conditions of self-regulation and self-management. This is a vital issue, the settlement of which will make it possible in the shortest time to accomplish the fundamental reorganization of domestic science, to eliminate to a significant extent its lag behind the world level, and to increase the influence of the Academy on the course of the processes of perestroika.

The by and large correct idea of the formulation and implementation of programs of different levels suffers from lack of completeness. This also applies to the 15 most important state scientific and technical programs, which were approved by the USSR Council of Ministers.

I will cite just one example. We formulated the Promising Materials Program, which encompasses the development and output of specimens and the subsequent industrial production of promising materials to 2005. Whereas the first part, that is, development, is being financed, although in cut down form, industrial production hung in the air.

Calculations show that capital investments in the amount of 93 billion rubles are needed for implementation up to 2005. For 15 years, if you think it over, it is not that terrible, but, unfortunately, no one is undertaking to settle this fundamental question, including the USSR State Planning Committee. While if we do not produce new materials in the needed quantities, I dare assure you that we will not have, of course, any scientific and technical progress.

The interrelations between the USSR Academy of Sciences and the republic academies should be raised to a

new level. For this the role of the USSR Academy of Sciences itself in the formulation of a common scientific policy in the country should first of all increase. Moreover, the effectiveness of overall supervision in the conducting of basic research in many respects depends on the provision of guarantees that the budget assets, which are allocated for all-union priorities, will not be redistributed at the republic level for other purposes. It is possible to achieve this by the establishment of a special all-union fund, the assets from which would be used for the financing of basic research programs. This fund should be allocated by the USSR Supreme Soviet. Its distribution can be carried out on a competitive basis by a special scientific council, which includes leading scientists of the entire country. The chairman of the State Committee for Science and Technology should head such a council.

Academician Ye. Chelyshev

It is hardly possible to doubt that the drawn out pace of perestroika in many respects depends on the state of culture of our society and on man, in whose name it is being carried out. In connection with the change of the external world man is reforming himself. Therefore, perestroika should be regarded as the change of man, the renewal of his life, psychology, and spiritual world. However, some believe that this process can take place with increased speed and that it is possible to achieve the real flourishing of the individual and our life by some fast methods. This task is hardly accomplished that easily and quickly.

It seems that very many good decisions remain good wishes first of all because they do not take into account the readiness of society and people and their cultural level. Decisions, which are not intended for those who will implement them, are being made. Just recently I had occasion to visit Japan. Thus the Japanese "miracle" is precisely the attitude toward labor, toward nature, and toward each other. The overall cultural level of the people is to some degree an answer to the question of how this "miracle" could have occurred. In our country, unfortunately, the ideas of equality and the struggle against the world of the rich and poor assumed the ugly form of leveling. Before looking at their own plate, they look to their neighbor—did he get a piece with a little more fat? The words of O. Henry about one of his heroes—he regarded every shilling in the pocket of someone else as his own insult—apply to some degree to very many of our people.

It seems to me that both our economic reforms and the cooperative movement in many respects are being impeded due to such an attitude toward property, capital, and each other.

A new decree on the defense of dissertations was recently adopted in the Higher Certification Commission. It is stated plainly there: The first candidate examination is

on Marxist-Leninist philosophy. Why only on Marxist-Leninist philosophy? Why should our scientists not know the entire history of philosophy?

It seems to me that the aspiration to restore healthy relations in society is very important. And it is necessary to begin with the humanization of education. With the organization of lyceums and schools. For previously everything in our country was at the same level: universities, syllabuses. This standardization and leveling were extended to all levels of education. The humanization of society envisages first of all the differentiation of education.

R. Papilov, Chairman of the Central Committee of the Public Education Workers Union

The lack of an efficiently operating system of the objective scientific examination of projects and programs, which are proposed for competitive financing, and the reduction as a result of conversion of the financing of research in accordance with the orders of defense sectors are creating an alarming situation for a number of scientists and uncertainty about tomorrow. In this connection I would like to support the proposals on the modification of the system of financing and the increase of the share of assets for exploratory research to 60-70 percent.

The lack of normal conditions for life and labor is forcing gifted scientists to leave for cooperatives, and in a number of cases to leave the country. Not everything is well also in the sphere of the remuneration of the labor of scientific personnel.

Last year, for example, associates of scientific research institutes of the USSR Academy of Sciences earned 40-50 percent less as compared with their colleagues from institutes and design bureaus of such sectors of the national economy as machine building, metallurgy, and the fuel and power and chemical complexes. It is possible to say as much as you want about the priority of basic research, but while the wage of scientists of this sphere lags behind those who work in sectorial science, there will be no results.

The existing system of the certification of scientific personnel requires substantial changes and, perhaps, elimination. Practical experience of recent years has shown that personnel lacking promise both were and remained at many institutes. Certification should generate not stress and conflicts, but a sense of satisfaction with the objectivity of the evaluation of scientific skills. It is necessary to make the necessary changes in the certification system already this year, otherwise a wave of new conflicts and complaints will sweep over collectives.

With allowance made for the many appeals it is necessary in the immediate future to introduce certainty in the status of the scientific institute and to understand who

should bear responsibility for the creation of the conditions of the normal vital activity of academic institutions, taking into account the centralization of the planning and financial, construction, repair, supply, medical and sanatorium, and other functions of the staff of the Presidium of the USSR Academy of Sciences.

The Presidium of the USSR Academy of Sciences in its activity must rely more on the scientific community at large. It is good that councils for the improvement of the activity of the Academy of Sciences, including the development of the social infrastructure, have been set up. But this is insufficient. It is necessary to use democratic levers more effectively, a system of communication of scientists of the academy and the broad group of scientists, who represent the vanguard and future of science, is needed.

I want to return again to the proposal which we advanced in 1989 at the meeting of the party and economic aktiv of the Academy of Sciences—on the annual holding of conferences of scientific personnel before the annual general assembly of the USSR Academy of Sciences. This would fill its work with a new content and would also make it possible to rely on the opinion of those who are actively participating in the creation of scientific values.

Taking into account the worsening of the social status of scientists, the central committee of the trade union put before the government specific demands on the improvement of the working conditions and social status of scientists. We support granting the USSR Academy of Sciences and the academies of sciences of the union republics the right to settle independently questions of the remuneration of the labor of scientific personnel.

Academician V. Zuyev

The year 1989 was the year of the changeover of all science to cost accounting and self-financing. We expected very much from this year as a fateful year, only we were not certain where fate would take us.

On the one hand, the 1989 budget increased by 1.5-fold. It would seem that it only remains for us to rejoice. On the other hand, the situation is such that the majority of speakers are saying that there is not enough money. It is a legitimate question: What happened? I would like to stress that the country is in a deep economic crisis. This crisis is inevitably also affecting the Academy of Sciences.

Our folklore was always advanced. And now it is formulating this situation in the following manner: The old generation is seeking money, the middle generation is rushing to the West, while the younger generation is rushing to cooperatives. Unfortunately, this aphorism correlates very, very strongly with our reality.

I would also like to dwell on one negative phenomenon which is characteristic of the institutes that were connected with significant amounts of work for defense. The

point is that precisely these institutes have today found themselves in a most difficult situation. To illustrate, I will cite an example with my own institute—the Institute of Atmospheric Optics of the Siberian Department of the USSR Academy of Sciences. During the 20 years of its activity it had quite significant amounts of contract work with defense sectors. Here we had all these years permanent clients, who understood that if they financed institutes only with regard to purely applied jobs, they would soon cease to be useful for them. Therefore, we also derived considerable resources from these contracts for our basic science. And then one fine day all this instantaneously collapsed.

We received a telegram from our main clients, who informed us that the contracts, which had been concluded up to 1992, on 1 January are terminated without right of appeal. In our state, which for the present is still not a law-governed state, this is a quite natural action. We immediately lost, I would say, the basic sources of financing of basic science. We can say that under such conditions any serious basic science is out of the question.

The institutes were socially unprotected. If only some severance pay for the transition period were offered. As a result in our country basic science at many institutes and at practically all higher educational institution is beginning to deteriorate visibly and quickly. The decline of labor discipline, which is being spurred on by the departure of young people to cooperatives, is intensifying. Moreover, many of them are taking "know-how" with them without any compensation.

And a final thing. I would like to emphasize that whereas at the large Academy of Sciences the problems of financing today are urgent, at the regional departments and in the republics they are doubly urgent, because there the budgets were significantly lower than at the large academy.

Professor A. Dobrushin

Academies of sciences exist in all civilized countries. Our academy is unique for the fact that its influence is due not only to the great scientific prestige of its members, but also to the administrative power over other scientists. We believe that such a combination is harmful. For scientific administrative talents are rarely combined in one person. Only the efficient interchangeability of the people, who hold administrative posts in science, can be a guarantee against monopolism in science.

The planning of basic science and its administrative supervision are no more sensible than planning and supervision in art and literature. Modern basic science is made by small scientific collectives, which include from several tens of people to one person. Precisely such a collective should be the vehicle of the sovereign unit of science.

If there is one thing that basic science needs, it is not supervision, but financing. Basic science cannot live on

cost accounting. Ideally it seems that for the combating of monopolism in science the functions of financing should be completely separated from the administrative structure of science. Financing should be based on the decisions of democratically elected, changeable expert councils and rely on the evaluation of foreign scientists. In short, it should be multichannel.

It seems that the institute of the Academy of Sciences should be a federation of sovereign primary scientific collectives with a director, who is answerable to its scientific council, up to the possibility of his recall. It is necessary at last to look at the experience of foreign science. Whereas electivity of the directors of enterprises is an innovation, which nearly does not have precedents in the world, in accordance with the traditions of world science the director of a scientific institution is always elected by the collective of the institute. And other situations should become impossible.

Academician A. Abrikosov

According to my observations, the lag in the area of basic research will increase at an ever accelerating pace. And this is connected first of all with the fact that an enormous outflow of the best people abroad is occurring. This is already now a very conspicuous phenomenon. But after a while it threatens to turn into a mud flow, which in general will carry away all our basic science. In order to combat this, it is necessary to give our scientists humane conditions of existence.

With regard to the financing of science. The system of grants exists in the West. In our country they have attempted to introduce such a system. To what did this reduce? Everyone wrote some projects, they went for the approval of scientific councils, then everything was turned over to the department. The department piled them up, but then divided the money among institutes. But for what, then, are these projects? To mislead the Council of Ministers with regard to the fact that here competitions of projects exist.

At the same time the system of grants abroad is working. What is needed so that it would also work in our country? There money is issued for a specific job for five years to an independent organization. Our scientific councils could be such independent organizations. But then they should have money at their disposal. They would also share it. This should be accompanied without fail by a contract system of the hiring of scientific personnel. If there is not enough money, it is necessary to dismiss the appropriate number of people. This also happens in the West.

In our country there are innumerable commissions, which pester people about how many instruments they have purchased and what profit has formed at their place. Until we cope with these difficulties, we cannot in reality introduce a system of grants. The conversion of higher education to cost accounting is an obvious mistake. At present when being admitted to higher educational institutions they already look to see whether or not

they will pay them. Such an arrangement will contribute to the decrease of the number of people with a higher education and to the decline of culture in the country. The institutes, which live on a budget, cannot pay for graduates. I would think that it is necessary to abolish this system, while if it is preserved, the academy should have the opportunity to pick free of charge the best people for its institutes. This is a very small percent. Otherwise we will be left without replacements.

Corresponding Member of the USSR Academy of Sciences G. Yagodin

I have never spoken in favor of the principle of the cost recovery of the higher school and consider this business absolutely harmful and hopeless.

It is a question of the fact that in case of personnel training the sectors, which derive profits, would partially compensate for the training of specialists. This does not apply to the Academy of Sciences and to pedagogical, medical, and many other specialties.

The secondary school is now the weakest aspect of personnel training. The secondary school with its overloading of the syllabuses and the lack of balance in general had the result that children are beginning to attend it with enormous dissatisfaction, while parents are beginning to be afraid of the school. Therefore, mainly work on the syllabuses along the lines of their simplification is now under way in order to make education more accessible.

There are now appearing educational institutions of a new type—gymnasiums, lyceums, and colleges, many of which institutes of the Academy of Sciences manage.

V. Leonov, Director of the Library of the USSR Academy of Sciences

I will recall that in the country there are 680 academic libraries with a staff of more than 6,000 people, while the book and journal collections are approaching 1 billion. Today the question of how to save this property is urgent as never before.

The events of the past two years in Leningrad show that new disasters with consequences that are hard to predict are possible. I believe that the situation with librarianship at the academy should become the topic of a special discussion.

At our academy a change in the awareness of the need for the qualitative improvement of the situation in library and information activity has not yet occurred. Unfortunately, general talk, advice, and sympathy prevail, while the work reduces to the patching of holes, and not to the radical reform of the attitude toward libraries.

The library of the Academy of Sciences was conceived and established as the soul of the academy, one of its priceless scientific tools. For more than 200 years both the library and the academy existed together. This is a

very important principle of life, which is so dear to us today and which, unfortunately, has been violated.

The fire in February 1988 did enormous harm to world culture. According to the preliminary data, we lost about 400,000 periodicals, a third of the newspaper collection. The investigation of the fire has not yet been completed.

At the library of the Academy of Sciences the repair work in the repositories, in which the fire was and which suffered from fire, moisture, and high temperature, has been completed. This is 26 repositories. The restoration work on the completion and restoration of collections is continuing. In all 30 centers are participating in the restoration work. These are libraries, scientific research institutes and educational institutions, and museums.

On 15 March 1988, that is, a month after the fire, the library was opened to readers, and at the end of December of last year we had attained in the basic indicators of service the level before the 1988 fire.

International contacts are now being developed very actively and practical assistance continues to be received from our foreign colleagues. I want to recall that, except for repair, all the basic types of work were performed by associates under the most difficult conditions.

What at present is preventing us from working? I want to name several problems, they seem very important to me, I ask you to direct attention to this.

This is the problem of the management of the library. The lack of an owner of the library, however sad, is preventing our work from being done in a high quality manner. Everyone looks after it, but if everyone does, it is no one specifically. Formal subordination to the presidium in practice means hardly anything. In my deep conviction, either the chief scientific secretary of the academy or one of the vice presidents should supervise our library.

The second problem is the development of the material base. We did not receive a millimeter of additional space, while our collections increased during this time by 1.2 million copies.

I will add to what has been said that we have been dropped from the long-range plan of the Leningrad Scientific Center on the construction of book repositories for the 13th Five-Year Plan. The reason for rejection: There are no construction capacities, that is, there is no one to do the building, there is no manpower.

I would like to raise the question of trust. I supervise one of the strongest book repositories. As compared with the civic responsibility, which I bear, I am a librarian without rights. On the one hand, I should understand problems and solve them. On the other hand, I should ask, insist, and persuade that they solve them above.

Fate of Science in USSR

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[Article: "The Launch Into the Future"; first two paragraphs are *PRAVDA* introduction]

[Text] The Annual General Assembly of the USSR Academy of Sciences has concluded. At the closing meeting the highest award of the academy in the area of the natural sciences was presented to prominent Soviet physicist N.G. Basov. The winner delivered a scientific report. Gold medals and prizes named after prominent figures of science were presented to scientists of the USSR Academy of Sciences and other departments, who had written works of great theoretical and practical importance. The General Assembly also adopted a decree on the restoration to membership of the USSR Academy of Sciences of scientists, who had been groundlessly expelled from it.

Today *PRAVDA* concludes the direct reports on the assembly of the USSR Academy of Sciences. But we will return again to the results of its work and to the coverage of the problems facing Soviet science during the era of perestroika.

Corresponding Member of the USSR Academy of Sciences G. Starushenko

The alarm of members of the Academy of Sciences about the fate of science and about the fate of our country was heard in many reports. Indeed, our state is going through a serious crisis. But this is not a political crisis. You will not resolve it by political methods, by rearrangements of various political changes and coordinations of programs, platforms, and so on. This is a social crisis. Here, too, the elaboration of fundamental problems of social development is required. Our country has embarked on a new, unexplored path. And, whether or not anyone likes this, this is a fait accompli, which should be constantly taken into account.

At one time Academician Landau with his characteristic wit said that the sciences are divided into the natural, unnatural, and antinatural sciences. I hope that today there are no longer antinatural sciences. But not only the social sciences, but also the natural sciences found themselves in the position of unnatural sciences.

In our press, unfortunately, tendentious evaluations of the state of science, which, undoubtedly, are decreasing its prestige, are being given. It is asserted that our science lags behind world science by tens of fold. That bluntly, without any reservations—tens of fold.

Outstanding achievements of Soviet science were spoken about here, and they are well known. As for Soviet social sciences, in any case in the past decade their prestige has increased significantly.

I want to submit several specific proposals on the popularization of social science.

First, I want to support the proposal on the establishment of the Center for Humanities Research imeni Dashkova. It is merely desirable that the operation of this center would not develop into an ordinary house of culture and education, that members of the Academy of Sciences would take part in it, that each one would speak if only once, and not only social scientists, but also representatives of the natural sciences.

I believe that it is necessary to establish under the academy scientific councils, to which it is necessary to attract young talented scientists and those people, which aspire to be elected members of the academy.

Academician G. Mesyats

The political instability, which we are observing today in our society, and the regular replacement of oblast committees are having an enormously bad effect on the situation in regions.

If we talk about the Ural region, our institutes and institutions are located in nine oblasts of the Ural region. In several oblasts the oblast party committees have already changed three or else four times each. Moreover, at times new executives arrive, to whose declarations (as was the case in Bashkiria): "Let us support the Institute of Mathematics, which does not have premises, but fine mathematicians work there," the former management responded: "But what will mathematics give the national economy of Bashkiria?" One has occasion to encounter approximately such a level of opinions.

I completely agree with the remarks which were made here in connection with the problem of financing and with the "brain drain" problem. They are especially dangerous for regions. But it seems to me that we should ourselves think about our own problems. The coordinating councils for programs, which have been set up in the State Committee for Science and Technology and which today actually distribute money, do not have adequate representation in the regions. And the situation today is such, Nikolay Pavlovich Laverov will confirm, that for the state programs of the State Committee for Science and Technology on the order of 1 billion rubles only several million rubles got to such a huge region as the Urals. And this to a considerable extent is due to the fact that in case of the distribution of these assets we do not have our own representatives in the soviets that exist there.

And a final remark. Comrades, there is nothing we can do today, we will not be able by any decisions of ours to eliminate cooperatives. The wage of young scientists is actually wretched—140 rubles a month, this is forcing them to go both to cooperatives and to centers of scientific and technical creativity of youth. The point is that the cooperatives and centers of scientific and technical creativity of youth, which were established directly at the academy, are fully utilizing our achievements, our results. And it is necessary to transform this "evil" into

"good." We need to see to it that what cooperatives earn would be partially returned, to the Academy of Sciences. And this we can do.

Academician V. Struminskiy

For a large number of years in the basic sections of science we held in practice the leading positions. However, in the past 15-25 years in the basic directions we have been losing more and more the leading positions.

The leading positions in the world are meant. And this is not an accidental process. In science the processes of narrow specialization and differentiation developed continuously. As a result the prediction of Marx came to pass and science developed into an enormous productive force of society.

The United States, Japan, and the FRG reacted immediately to this. A large number of small scientific organizations were established.

I will cite an example. The effectiveness of small scientific organizations was fourfold greater than that of medium ones and twenty-fourfold greater than that of large scientific enterprises. I wrote about this in the central press several times and spoke about this at assemblies from this rostrum, but the state of affairs in our country is actually not changing. But the fact is absolutely indisputable. And this will be so, if we promote to these positions not simply active people, but creatively active people, talented people, who have something behind them. But if there is nothing there behind him, one must also not give him money.

I believe that at this assembly it is necessary to make a decision on the establishment of such thinking, small organizations, which are financed through the state budget.

In our country an enormous reserve exists in science, but no one can introduce this reserve. Our sectorial science has become inadequately competent. And it is necessary to talk very earnestly about these things. All sectorial science is operating at the level of plant laboratories. And in order to raise this problem of introduction, it seems to me, our assembly should make a decision on the establishment of such small organizations of the Academy of Sciences and sectorial and VUZ science, which would engage in introduction, and only introduction, and would operate on finances of the State Committee for Science and Technology.

Academician V. Semenikhin

Several years ago during the analysis of the state of affairs with computer technology in the country the far-reaching and growing lag was explained among others by a main reason—that the Academy of Sciences had given up its institutes to industry and had moved away from this problem as the leader.

In recent times at the Academy of Sciences several institutes were organized in order to compensate

somehow for this shortcoming, and thereby our academy assumed moral responsibility before the people and before the state for the radical change and improvement of affairs in this field, which governs the pace of progress in scientific research, in industry, in the sphere of services, and wherever you like.

Now I want to speak not about my field of science, but it seems to me that this is a concern of each of us. It is a matter of the most profound crisis of economic science. Incidentally, I am speaking for a second time on this issue. And several years ago I foresaw the phase which we have now entered—the most complete uncertainty. I said at that time that our leaders in the area of economic science should be very cautious before uttering phrases. I do not understand now who is leading: Are journalists leading our economics scholars or are economists leading journalists, but to me personally this situation is becoming more and more incomprehensible. Because they are all together: Both are putting the government and legislative organs more and more into an impossible situation. Listen, this is not on the conscience of the USSR Academy of Sciences in the final analysis.

I often have occasion to speak with simple people—but I work in industry, they say: "Hey, you, academicians, what do you want, that we have capitalism, socialist, will you explain what kind of socialism? Where is your strategy? Fine, let us leave strategy aside. I believe that the laws on property, which were passed by the last congress, conform to the interests of the matter, such is my personal point of view. But how are they interpreting them? For they are interpreting them in completely different ways, at times very wrongly."

It is necessary to call economic science, and first of all economic science, to a most profound sense of responsibility.

Academician N. Lyakishev

Our people always treated our academy with respect and hope, expecting from it weighed, scientific sound decisions which face society. And it must be said that in the historical context the academy always lived up to the hopes of the people and fulfilled its mission.

In the spheres of the technical sciences, which are closest to me, there are a large number of outstanding achievements, which are regarded as world-class achievements.

However, in recent times, it must be stated frankly, in the press, at the Congress of People's Deputies, and in the Supreme Soviet we have been seriously criticized. Scientists have put the country in an impossible situation—that is what they are saying. Scientists did not suggest and did not warn at the proper time. And the lags behind the target in manner questions of scientific and technical progress are also directed at us, at science.

I should say that, of course, this criticism does not apply to individual scientists, although individual scientists at times are also criticized; this is criticism that is

directed on the whole at our science, at the entire scientific system. Of course, it is possible to dismiss this, it is possible to address this criticism to the bureaucratic apparatus, which we know how to do successfully. But if you take a deeper look, a large share of the responsibility is still on us. I believe that when some system or organization is able to take a detached look at itself, is able to criticize itself, that is, to treat its own activity in a self-critical manner, such an organization, such a system, and such a party are most viable here, are most effective and efficient. And we must strive for this.

Perestroyka in the broad understanding of this process at the Academy of Sciences should start with adherence to principles, with responsibility and accountability. If we do not introduce these three positions properly, I believe that we will not be able to implement perestroyka quickly.

At present perestroyka has practically not affected institutes. These are our main unit. There, as before, nothing has changed, the board of directors is elected in the departments.

While as to the middle management level—the heads of laboratories, the current election system has done serious harm. Now each of the candidates for a long time before the election tries to be good. Accountability has been completely ceased. And this circumstance under the conditions of collective egoism, which is flourishing, leads to the collapse of scientific production and discipline.

But there is also a second problem: what to do with the personnel we have. At the academy such a position, when 30-40 percent are working scientific personnel, while the remainder are ballast, has become firmly established. If we adopt this position fully, hence, we will not go farther. Here the system of competitions and the system of certification do not work. I believe that this is all in the hands of managers, in the hands of public organizations.

Corresponding Member of the USSR Academy of Sciences A. Fursenko

It is well known that at the Pushkin House and in the archive department of the Academy of Sciences there are very valuable archives on the history of science and on the history of our culture. I wanted to stress that this question was placed on the agenda long before the leak occurred at the Pushkin House. This accident, which greatly dramatized the events and showed us how close we are in reality to the abyss, to a catastrophe, occurred literally on the eve of the meeting. At the center of Leningrad, not far from Smolny, the construction of the new building of the Leningrad Institute of Party History and its archive with a total area of 24,000 square meters has now been completed. We ask that of them there be given temporarily, on lease, 4,000 square meters, in order to overhaul the Pushkin House and to house the academy archive, which is in critical condition and a building for which we plan to construct by 1995.

Party and soviet organs promised to help the academy, but all the attempts to get an official specific decree on this matter have not yielded a result. They tell us that this question will be decided favorably. But I know for certain that there is very strong resistance in the apparatus. I had a talk with the administrator of affairs, and he told me that we will, perhaps, give the Pushkin House something, but we will not give the archive of the Academy of Sciences anything.... This is a very painful conversation.

Nevertheless, taking into account the enormous importance of documentary materials, which preserve the memory of our past and of our national cultural heritage, about the importance of which now so much has been said in recent times, I want to offer to the general assembly the draft of a short appeal to the Leningrad leadership with the request to decide this question favorably. In it, in particular, it is stated:

“...In the collection of the Pushkin House and the archive of the Academy of Sciences in Leningrad there are such monuments of world culture and science as the manuscripts of Pushkin, Lermontov, Gogol, Dostoevskiy, and the founder of Russian science Lomonosov, and many others. Being invaluable national property, they were faced with the real threat of being lost.

“In order to save this documentary wealth from ruin, it is necessary to lease to the Pushkin House and the archive of the Academy of Sciences a part of the premises at the newly constructed building of the Institute of Party History and the Leningrad Party Archive on Ulitsa Voinova with a total area of 4,000 square meters.

“The General Assembly of the USSR Academy of Sciences addresses to you the urgent appeal to give assistance in the preservation of the unique set of monuments of domestic history and culture, which are in the archives of the humanities institutes of the Academy of Sciences in Leningrad.”

Academician V. Matrosov

The safety program, which is oriented to a large degree toward the technical problems of the assurance of safety in case of accidents, catastrophes, and emergency situations, has already been spoken about in the report of K. Frolov. I would like to talk about the problem of the stability of development, the international and domestic stability of the balancing of development.

This problem, as you understand, is now extremely urgent. We are all impressed by the social upheavals, which testify to sociopolitical and socioeconomic instability. The Supreme Soviet has set as priority number one the task of stabilizing the economy of our country. Ecological safety and stability are also clear to everyone and there is a connection of the domestic tasks of stability with the international tasks, which also involves military political and strategic stability.

It seems to me that the only approach is to formulate a program of basic research on the international and domestic stability of development and the devising of systems of forecasting and the support of the making of stabilizing strategic decisions, in order to obtain results which, first, will bring us up to the world level in this area and then, perhaps, to the stage, when we will be able to provide practically significant results.

And it seems to me that the consolidation of forces in this area could lead to the first results in several years.

Academician M. Ivanov

The offensive figures have already been mentioned here—140 rubles for a person, who has studied 15 years and in addition has graduated from such a prestigious institution as Moscow University. And 175 rubles for a person who has studied 18 years, including 3 years in graduate studies of our institute.

Comrades, these are the people who in 10-15 years should replace you and me in this hall, and these people did not leave the Academy of Sciences until recently because there was nowhere to go. And now, when the situation has changed, when there are large salaries and bonuses at sectorial institutes, when the system of cooperatives has appeared, these people are leaving the institutes. The directors, whose institutes are not connected with industry and do not have competitors in industrial departments, probably are not experiencing this. But here, at the Institute of Microbiology, people are actually leaving. True, thus far only one person has left for a cooperative, but several people have left for the institute of the Ministry of the Medical Industry, the former Ministry of the Microbiological Industry, because the remuneration of labor there is incomparable to what they receive at the institute.

I want to recall that on the initiative of the presidium and leadership of the academy in the last two years, precisely in 1988 and 1989, at academic institutes the wage of low-paid categories of associates was increased. I mean the administrative and management apparatus, the laboratory staff, pilot production, and engineers. That is, if we now attain the 1988 level in base financing with respect to the wage, we will all the same not be able to cover all the expenses that have actually formed here in these last two years.

Corresponding Member of the USSR Academy of Sciences V. Alemasov

I would like to draw your attention briefly to the situation of the scientific centers and affiliates of the Academy of Sciences. If I were to mention the names of A. Arbuzov, B.A. Arbuzov, Academician Zavoyskiy, and others, you would say: This is Kazan science and relatively recent and advanced science. If I were to add to this that now five academicians and a large detachment of doctors and candidates of sciences are working here, it will be clear that the Kazan Affiliate not long ago, and

now a scientific center, as well as the tens of ones similar to it are good centers of the development of science of our country.

I believe that the policy of our academy and presidium, which is aimed at the increase of such centers and the provision of support and assistance to them, is very justified and, it seems, that it is serving as the basis of our successful development.

And still for all these positive things, I admit, a sense of some provincialism is not leaving me—a representative of this outlying science, just as many of our colleagues. Perhaps, we are all the same experiencing certain difficulties in the fact that a certain equality with our basic institutes and even with the republic academies is lacking.

I would compare the situation here at our scientific forum of representatives of such scientific centers and affiliates with the situation of the representatives of the autonomies, who now, as you know, are actively speaking out in the Supreme Soviet and at the Congress, while also enduring anxiety, pain, and alarm. Everyone wants to be equal.

Now, it seems that the representatives of the affiliates (and they, it appears, are quickly becoming nonexistent and only the regional scientific centers remain as the basic unit) also want to be equal. In what should this find expression? In good representation in all kinds of expert and scientific councils, which determine the fate of competitions and divide up money.

These are several wishes, they, in my opinion, are entirely practicable given good will and the correct view of the development of outlying science.

Academician N. Dobretsov

Our economy, and particularly our exports, is based on raw materials, and for a long time to come this raw material orientation will remain the leading one, at least in the share of our exports about 50 percent is petroleum and gas, about 20 percent more is gold and diamonds, and there is a little of everything else. But petroleum, gas, gold, and diamonds are the leaders, by which our exports proper and imports are supported. And whoever is clothed in exports is actually clothed in exchange for gold, petroleum, gas, and diamonds.

We discussed in detail at the Geology, Geophysics, Geochemistry, and Mining Sciences Department the fact that scientific and technical progress has least affected this sector, and among the 15 state programs, which support scientific and technical progress of the State Committee for Science and Technology, there is not one which supports scientific and technical progress in the raw materials subsector.

I consider it necessary to state that if a substantial spurt is not ensured here, we will continue to lose very much. And we are losing at all stages: at the stage of exploration

and prospecting, at the stage of the extraction of these raw materials, at the stage of processing, and at the stage of the sale of these raw materials. And without a substantial change the main reserve and basis of our well-being will, as before, take a back seat.

In my opinion, the main program, which could ensure progress here, can conditionally be called geotechnology of the future. Moreover, the stage of geological research, exploration, and prospecting, the stage of extraction and dressing, including the increase of the recovery of petroleum from wells, and the stage of the processing and use of these raw materials would be included here.

I would like to say that I categorically do not like the term "regional science." Science cannot be central and outlying or regional, science is unified. It can be a question only of the establishment of a network of scientific centers, each of which is equivalent and equal. But the situation in our country is heading in the direction of the excessive concentration of science in Moscow and Moscow Oblast. At one time there was Leningrad, which was on the level of or even ahead of the Moscow Scientific Center, but gradually the share of both Leningrad and many other scientific centers decreased.

With the establishment of the Siberian Department a new powerful center appeared, first of all in Novosibirsk. The other centers of the Siberian Department, it must be said, are far less developed, and this is also one of the tasks which were incorporated in the concept of the development of the Siberian Department. We should all think together about the establishment of such equivalent, equal centers. And if they do not develop or grow weak, this will do first of all irreparable harm to all science.

Some capital science in the United States or Japan or in France is out of the question, talk about this arises only in our country. If we understand this, there should also be a thought out program of the development of such scientific centers, their priority development. For the present the situation is the opposite.

Academician N. Logachev

I have already said that ecological themes are somehow finding themselves at the edge of our interests. It is necessary that they would all the same not be displaced to the edge, but would be at the center of our scientific and civic attention. I should say, taking advantage of this general assembly, that in general on the planet there are not that many places that are outstanding in many respects. And one such region is the region of Lake Baykal. Baykal and the Baykal relic zone are a native, natural laboratory, a model, where living and nonliving nature interact, forming the corresponding ensemble of biological structures and the corresponding ensemble of natural objects, which are located in this biological structure, as an arena of such complex interaction of many million years (perhaps, this interaction has gone on now for 60 million years). Baykal is becoming more

and more a center, a focus of attention of the international scientific community. Not by chance both in the report of the president and in the statement of Chairman of the Siberian Department V.A. Koptyug was it mentioned that we have already come to a conclusion and have come forth with the following initiative—on the organization of an International Center of Ecological Research. This is probably correct. But, in order to organize well the activity of this future center, we should consider most seriously how it will operate and what assets and resources must be invested in this entire matter. Time no longer waits.

Report by USSR Academy of Sciences President Marchuk

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[A. Pokrovskiy report: "Science of the Times of Perestroika"]

[Text] As with many other questions, the topic of science in our country generates the most conflicting opinions. Their variety is natural. The country's economic mechanism is being restructured and science must occupy a worthy place in that mechanism if we want our country to gain leading positions in scientific and technical progress. We have a common interest in that. That is why readers have responded so keenly to the editorial office's invitation to continue the discussion on the future of science which was conducted at a recent scientific and technical conference on problems of managing scientific and technical progress.

I recall that, on the one hand, the conference noted that we should not talk about generally perceptible improvements, the country's present scientific potential is not ready to fully resolve the tasks facing the country. On the other hand it was noted that the national economy's long-standing unreceptiveness to scientific and technical innovations, disproportions in structural and investment policy, and omissions in developing science's material base have also helped to create barriers both between science and production and between academic or higher education science and sector-based science. Of course, it is from scientists above all that we expect answers to these and other questions. And they tried to provide them at the USSR Academy of Sciences annual general meeting [AGM] which opened in the Moscow State University assembly hall yesterday.

Never before, surely, has the USSR Academy of Sciences AGM opened in such a complex and tense situation demanding multifaceted, bold solutions. The agenda itself demonstrated a readiness to adopt those solutions. In addition to the traditional opening address by Academician G. Marchuk, president of the USSR Academy of Sciences, and the report by Academician I. Makarov, chief academic secretary of the USSR Academy of Sciences Presidium, on the work of the USSR Academy of Sciences Presidium and the fulfillment of USSR

Academy of Sciences general meetings' decisions in the period under review, the agenda included four more reports on the theme of "The role of science in the renewal of society." They were delivered to the general meeting by Academicians V. Kudryavtsev, K. Frolov, O. Nefedov, and V. Koptyug, vice presidents of the USSR Academy of Sciences.

This meeting, Academician Marchuk, president of the USSR Academy of Sciences, noted, is taking place at an extraordinary, crucial time. The country is now at a historic turning point, society is closely examining and analyzing its past and critically evaluating the present and seeking forms and methods to create a qualitatively new future.

The concept of perestroyka has absorbed all the previously untapped potential of scientific and social thought. Social practice is being renewed in all areas. But perestroyka is raising more and more new problems. Most often they are more difficult but also more long-term and creative problems. This determines the crucial tasks placed before fundamental science — both in creating a new knowledge base and in promoting social, political, and cultural development.

The logic of perestroyka has set Soviet science a task: to quickly reach the foremost position in the most important areas of fundamental research and, on that basis, implement the program for the socioeconomic reorganization of Soviet society.

Each month, each day, each week produce more and more new events which change our lives and often lead to a fueling of tension in society and the aggravation of the situation in the country. That is precisely why it is becoming clear to the majority of people now that cardinal measures are needed to stabilize the situation in the country.

Our country's scientific community bears particular responsibility. The strategy of perestroyka is based on a thorough understanding of science's role and the assimilation of its results as a powerful factor in attaining a qualitatively new state of our society.

The scientific backup for perestroyka is now becoming a priority. The abandonment of the administrative command system, the implementation of economic and political reforms, the creation of a rule-of-law state, and the elaboration of a realistic policy are impossible without the scientific community's constant involvement as an integral component of the political process.

Political and economic solutions are becoming particularly important in view of the heightened social perception that exists. Here, too, scientific forecasting and scientific expertise can give invaluable assistance.

The scientific community's extensive involvement in the decisionmaking process in addition to fulfilling its own, purely scientific, main function can and must be a

powerful instrument for the democratization, humanization, and intellectualization of our society.

All this has made us realize the need for a detailed analysis of the entire system of work of our scientific institutions engaged in the expert appraisal and scientific validation of the country's development prospects.

The structure and methodology of forecasting and analysis have been radically revised and the academy has assumed responsibility for producing a comprehensive socioeconomic prognosis of the country's development over 20 years. This prognosis must replace the existing Comprehensive Program for the Country's Scientific and Technical Progress, which was closely linked to the elaboration of preplanned documents, with the result that departmental interests often eroded its objective scientific assessments and forecasts.

In addition to the annual report, we have presented to today's meeting one of the key methodological problems—that of the interaction between science and society. It seems to me that our society is now going through a stage of transition from a critical, consumerist, and sometimes disdainful attitude toward science to an understanding of the real significance of scientific knowledge and method in the process of its renewal.

Science, first and foremost fundamental science, must exert a determining influence on the sphere of material production, the environment, and international relations. Consideration of this problem is now highly important and topical.

Permit me now to briefly summarize the scientific results achieved by the Academy of Sciences in the year under review.

I shall begin with the social sciences, because the research of our scientists in the humanities is at the center of public attention. The scale and depth of the process of socialism's renewal are largely determined by its comprehensive character. The interconnection between the economy and policy, law and social relations, and national psychology and everyday traditions is so great, varied, and contradictory that underestimating the importance of any of the elements of social life in the course of perestroyka and misunderstanding of its development trends may seriously slow it down or substantially alter the expected results.

My point is that in the past two to three years a start has been made on developing the processes of humanizing fundamental science in the country, eliminating the various manifestations of technocracy, and increasing the attention paid to developing research in the social sciences and humanities, and there has been an orientation toward man.

Recently the Academy Presidium examined proposals from the social sciences section on measures affecting the development of research in the sphere of social sciences.

A decision has been adopted to broaden the front of research and create some new scientific institutions. For example, our proposals on organizing a socialist market institute and a USSR Academy of Sciences analytical center on problems of socioeconomic and scientific and technical development are now being examined by the USSR State Committee for Science and Technology.

As for the concrete results of scientific activity, I should like first to talk about the work, carried out in accordance with a USSR Supreme Soviet resolution, on the preparation of a report to the USSR Supreme Soviet on the state of the scientific elaboration of the problems of economic reform in connection with the examination of the relevant package of draft laws at a Supreme Soviet session.

It was felt expedient to instruct the Economics Department to prepare the report to the Supreme Soviet. Afterwards these materials were presented to a round-table session involving economists, sociologists, lawyers, people's deputies, and representatives of interested ministries and departments and the mass media. In the light of that discussion the report was finalized and presented to the Supreme Soviet. But many problems still remain and must be resolved. It must be said as clearly as possible that the effectiveness of the scientific and scientific-organizational activity of the Economics Department and its institutes must be fundamentally increased.

Scientists' efforts in the sphere of philosophy and law were aimed at elaborating a theoretical framework to support the renewal and humanization of social relations. During this work their creative potential and all classical philosophical themes were focused on problems of man. A Human Sciences Center has been set up and is operating and work on a series of major monographs is in hand.

A concept of the formation of a society of renewed socialism, including an analysis of the development of a socialist formation in the context of the evolution of world civilization and the study of various models of socialism, has begun to be elaborated.

I should like to note the important initiatives of our lawyers who, together with Supreme Soviet deputies, are doing a lot of work in the drafting of legal acts. There is a particular need to mention our lawyers' preparation of a draft concept of our country's new constitution, which was recently presented for examination by a session of the Academy of Sciences Presidium.

The characteristic feature of historians' work is that they are addressing new themes and poorly studied or controversial questions.

The Literature and Language Department faces enormous tasks. This department's scientists have suggested new approaches to the solution of complex questions of ethnolinguistic relations in the country. They have made

a substantial contribution to elaborating a draft law on languages which will be given a hearing soon at the Supreme Soviet.

One of the priority areas of fundamental linguistics is the study and preservation of the languages and cultures of the small peoples.

Dogmatic approaches to artistic creativity in literary science are being reassessed. Academic anthologies of the works of Akhmatova, Blok, Mandelshtam, Pasternak, Platonov, and other authors are being published here using new methodological principles for the first time.

In his presidium report "Literary Science as a Precise Science," Academician D. Likhachev convincingly showed the permanent value of studying source and archive material for the country's science and sociocultural development.

In this connection the question of opening the archives and placing them in our institutions is still relevant. I can tell you that the presidium has passed a resolution to allocate our present presidium building for the organization of the Ye.R. Dashkova Humanitarian Sciences Center.

Moving on to the results of scientific activity in the sphere of the natural sciences, the president of the USSR Academy of Sciences dwelt in particular on works on high-temperature superconductivity. Significant results have been obtained in this area by scientists in Moscow, Chernogolovka, Gorkiy, Tallinn, the Urals and Siberian departments, and the Leningrad scientific center.

A vast range of extragalactic astronomic research has been carried out within the space program using a 6-meter telescope. A young galaxy marked by a low heavy-element content has been discovered.

The Department of the Physical Technical Problems of Power Engineering has paid great attention in its work to elaborating a strategy for developing the country's power industry in the coming decade and beyond. An Academy of Sciences commission has developed a number of alternative power industry development programs providing three economic development scenarios using three different versions of energy saving and the export of energy resources.

The academy's scientific institutions have actively joined in the solution of problems of the reliability and security of atomic power stations. The newly created Academy of Sciences Institute of Problems of the Safe Development of the Power Industry has elaborated the principles and methods of probabilistic analysis of the reliability and safety of units and other elements of nuclear electric power stations [AES] as well as the principles of creating an integrated computer system for the analysis of the after-effects of AES accidents. The Belorussian SSR [Soviet Socialist Republic] Academy of Sciences has joined in this work.

As for information technology, computers, and automation, it can now be said that the CPSU Central Committee and USSR Council of Ministers decisions to develop scientific centers in the computer technology sphere within the Academy of Sciences is starting to have a tangible influence on the overall potential of research in the country.

For example, at the end of 1989 the "Elektronika SS SBIS," [expansion unknown, possibly: high-speed very large-scale integrated circuit] developed by the Academy of Sciences and the Ministry of the Electronics Industry, capable of 250 million operations per module per second, underwent factory trials. A double processor machine capable of 500 million operations per second is nearing the commissioning stage. The "Elbrus-3," capable of 1 billion operations per second, is in the final stage of creation.

There is another important result. The world's first laser information storage unit using optical cylinders has been developed and has undergone state tests. The design has been recommended for batch production, and a trial consignment has been included in the state order for the Ministry of the Electronics Industry. The wide-scale introduction of this device will make it possible to resolve the problem of external storage for personal computers. This is an example of a major piece of comprehensive work in which more than 30 of the country's leading scientific organizations have taken part, including the leading organization—the Ukrainian Academy's Institute of the Problems of Information Recording.

Progress in computer technology is now determined primarily by components. Scientific collectives from newly created or reinforced centers in Moscow, Leningrad, Kiev, Minsk, Taganrog, Novosibirsk, Krasnoyarsk, Tbilisi, Riga, and Vilnius are taking part in this research program. Research is being carried out in close conjunction with enterprises from the Ministry of the Electronics Industry, the Ministry of the Radio Industry, the Ministry of Communications, and other sectors.

In the sphere of the chemistry of new materials and materials technology, research is clearly oriented toward the creation of a new generation of construction and functional polymers, amorphous metallic substances, and ceramics with superconductivity and other important practical characteristics, which have an important practical application, light guiding filaments, and new materials for the electronics industry. A state scientific program of advanced materials has been drawn up under the direction of Academician B. Paton.

The problem of tumor research occupies a special place in biological sciences. The metastasin gene—the factor promoting the spread of cancer cells and the occurrence of metastasis—has been isolated.

Incidentally, it should be remembered that two state scientific and technical programs have already been put into effect. The first, called "Biotechnology," combines a

whole series of genetic engineering research studies. The second program is called "Human Genome." Its aim is to determine the sequence of nucleotides which constitute the human genome.

A complex situation has developed in radiobiology. This year it has been decided to organize a radiobiological society and the question of setting up a radiobiological institute is being studied. But these measures are still not enough to meet radiobiology's urgent needs.

Work to create new strains of agricultural plants and breeds of livestock is being expanded. Many of them have been accepted for state tests.

In the sphere of earth sciences, increased attention has been paid to problems of seismic zoning [rayonirovaniye] and earthquake prediction. The Academy of Sciences Earth Physics Institute has prepared a "Provisional Seismic Zoning Map of the Armenian SSR," and together with the Lithosphere Institute has published the "Methodological Foundations of Geological, Engineering and Seismological Studies in the Armenian SSR Disaster Zone."

The all-union program "Seismicity" has been developed and adopted, and a special "Prognosis" program and a new map of the country's seismic zones are being created, the latter to include all the latest data on processes in the earth's crust which lead to disasters. A package of special preventive measures has been developed for the territory of Kamchatka. An International Earthquake Prediction Theory and Mathematical Geophysics Institute has been set up.

Academy of Sciences' geographers have conducted a series of research studies in the nature protection sphere. A series of maps has been produced highlighting urgent ecological situations in our country. On this basis around 20 types of the most typical negative environmental changes have been highlighted, as have around 300 sites where such situations occur—they affect around 16 percent of the country's territory. The results of this work have been entered in a national report prepared by the State Committee for Environmental Protection for the Supreme Soviet and international organizations.

Major environmental research has been conducted by the USSR Academy of Sciences and union republic academies of sciences. This has already been mentioned above. The ecological program has led to the pooling of our efforts but needs further reinforcement. We hope to receive support for this research after the adoption of the USSR Law on Environmental Protection, the president said in conclusion.

Now let us take a close look at the new phenomena in the life of our main scientific staff, which were noted in Academician I. Makarov's report.

One of the USSR Academy of Sciences Presidium's main concerns was the creation of conditions for organizing competition and cooperation among scientific schools

and tendencies and the development of competitive principles in scientific research. The concept governing the formation of programs and recommendations on organizing the work of councils and competition commissions were revised on the basis of the year's experience of the work of departments and institutes.

The speaker believed that there has been a definite breakthrough in scientists' traditional passivity in defending the interests of science via the mass media. PRAVDA published a conversation with the president of the USSR Academy of Sciences entitled "Foundation of Progress" and POISK had an item entitled "How Science Should Be," items which invite a broad public discussion on this theme. Both items have had a great social impact and there have been many responses, primarily from academy members.

The new system of financing research is aimed at turning research collectives headed by talented scientists working on the most topical problems into the main links in the organization of science. Nevertheless, in 1989 the USSR Academy of Sciences encountered financial difficulties not typical of recent years. The point is that a number of important fundamental programs—in high-temperature plasma physics, controlled thermonuclear fusion, earthquake prediction, space research, and others—which were carried out by the Academy of Sciences with the participation and financial support of interested ministries, ceased to be financed by them after the latter switched to economic accountability. That places the fulfillment of a number of projects in jeopardy.

But on the other hand, this is the first time that the anthology "Fundamental Research for the National Economy" has been published for the occasion of the USSR Academy of Sciences AGM. The size of the anthology itself indicates the great potential of academic institutions, which can and must be used more actively in the country's economy.

This is just one facet of academy members' scientific and social activity. It is worth noting that 59 members have become people's deputies.

At the same time the speaker felt it necessary to make certain criticisms of them. I think, he said, that the general meeting has questions to put to its deputy-colleagues. USSR Supreme Soviet sessions hardly ever discuss and, more importantly, do not find solutions to questions of scientific and technical progress, the development of fundamental sciences, or the enhancement of the role of the USSR Academy of Sciences in our society's intellectual life. Speeches on these themes by deputies from the academy are extremely rare. We, as electors, are entitled to remind our esteemed elected representatives that they are representatives of the USSR Academy of Sciences in the supreme organ of Soviet power.

In the year under review there has been a reorganization and renewal of the network of the USSR Academy of

Sciences' scientific councils working on the most important problems, which has made it possible to step up their activity. The USSR Academy of Sciences Presidium recommended the broader involvement of young scientists and higher school specialists in their work.

Incidentally, the speaker recalled that work connected with the rotation of leading cadres of USSR Academy of Sciences scientific establishments is continuing. Some 195 institute directors have been elected and appointed on a competitive basis. One hundred and nineteen journal editors and 30 academicians have become honorary directors of institutes, and more than 130 members of the USSR Academy of Sciences have become advisers attached to the management of scientific establishments.

This was followed by a remark which, for many of our readers, seemed completely unexpected. It appears that difficulties related to the recruitment of young scientists have increased in the Academy of Sciences. The fact is that after the introduction of contractual mutual relations for the targeted training of cadres with the partial reimbursement of training costs, many higher educational institutions are reluctant to conclude contracts with the USSR Academy of Sciences. Yet its institutions cannot pay for students' training. Furthermore, the recruitment of talented young people is seriously hampered by low pay in USSR Academy of Sciences institutions and unsatisfactory social and everyday conditions. The monthly salary of a young scientific staffer aged around 30 is almost one-third lower than the average in the national economy.

Last October there was a party conference of USSR Academy of Sciences scientists in Zvenigorod. There it transpired that the scientific community of the USSR Academy of Sciences is almost totally unaware of the presidium's decisions on cadre policy, questions of democratization, the new system of financing, the development of the social sphere, and so forth. On the president's instructions a selection of these documents was again sent to all institutes as well as party bureau secretaries. The USSR Academy of Sciences Presidium will continue to inform social organizations of its most important decisions. But there should be some feedback, so to speak. The public's reaction to given measures are important to the presidium, as are their comments and suggestions.

Rapidly developing foreign economic ties are a comparatively new type of activity for the USSR Academy of Sciences. In addition to the traditional patenting and licensing work, the past year has seen an expansion in the work of creating joint ventures, and a search is underway for commercial aspects of scientific cooperation which would be new to the academy and could be economically very effective. According to the results for 1988 the hard currency revenue of scientific establishments amounted to 7 million foreign currency rubles while in 1989 it exceeded 10 million.

There are 33 joint ventures now registered at the USSR Academy of Sciences and more than 25 in the preparatory stage. Because of the imperfection of the existing legislation and the scant experience of joint work, however, academic institutions do not always make maximum use of such cooperation. This process demands attentive study so as to prevent the discrediting of the idea of the sensible joint use of our intellectual potential for profit and prestige rather than to the detriment of our science and state.

Recently, quite a large number of cooperatives have been created under the academy's institutes. Some of them are working very well, bringing great benefit to institutes and the national economy. For example, the cooperative attached to the Institute of Applied Mathematics, is using personal computers to develop top-class software at prices considerably below those current in this sphere. However, there have been examples in which highly dubious cooperatives have been created under the auspices of the USSR Academy of Sciences which discredit the academy and the cooperative movement itself. The USSR Academy of Sciences Presidium proposes a special examination of the question of the place and role of cooperatives in the academy system.

The so-called brain drain, that is to say, the departure of talented and well-qualified scientists abroad for long periods of work by invitation, is a relatively new but already acute problem for the USSR Academy of Sciences. A large number of our scientists have been invited to work in the United States. In 1989, 246 people left the Academy for long-term assignments of up to five years. The departure of Soviet scientists abroad for practical scientific training and work has become a natural process, but it is necessary at the same time to give serious consideration to ensuring that it is not detrimental to the development of Soviet science.

It is clear even from the brief exposition of the reports how the tone of the debate of vital tasks concerning Soviet science and of the role of scientists in perestroika was not the usual academic one but proceeded by way of discussion and did not duck issues. The next issue of *PRAVDA* will publish accounts of the reports delivered by the vice presidents of the USSR Academy of Sciences.

V.A. Medvedev, member of the Politburo and secretary of the CPSU Central Committee; I.T. Frolov, secretary of the CPSU Central Committee; and Academicians L.I. Abalkin and N.P. Laverov, deputy chairmen of the USSR Council of Ministers; are taking part in the general meeting's work.

USSR Academy of Sciences 1990 Annual Meeting Criticized

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[Article by Yu. Danilin: "Variants Are Possible. An Afterword to the Annual General Assembly of the USSR Academy of Sciences"]

[Text] Tradition was also not broken this time: The general assembly of the academy carefully examined the scientific results of the year—the ordinary little working plan of scientists of the country. It was also possible not to direct attention to its specific details, if it were not for two circumstances: The commission of the present presidium is ending, and in a month the same kind of assembly will summarize the results of a substantial period; moreover, the need for serious democratic changes has finally arisen at the academy, evidence of which is the impassioned disputes over the amendments to the charter and the statute on elections to the USSR Academy of Sciences, as well as over the proposals on the basic principles of the activity of scientific research institutes and the appearance on the official rostrum of a representative of a new informal organization—the USSR Union of Scientists. Precisely they convince one that the coming five years will be eventful and, perhaps, will change something for the better in the present state of science. And perhaps, even the general assemblies as well....

For many years I have heard here brilliant speakers—observant, witty people who are dedicated to science. The problems have been endured. No one senses them better and more accurately than they do. But to whom were these excited speeches devoted? The presidium, perhaps? No, there they also know everything without a speaker and politely nod as a sign of agreement and complete sympathy. The auditorium? The same picture. Then, probably, the technical secretaries, who attempt to record every sigh. Does someone read latter a synopsis of exceptional importance? I doubt it. Because the speakers repeat each other and the problems do not disappear.

Here a very respectable scientist complains of the miscalculations of the information science department: Scientists are developing supercomputers, which industry will not be able to acquire, there will not be enough assets. But the representatives of industry will learn of this, apparently, when the supercomputers are ready. You will not find in the auditorium, however you try, either a minister or a chief of a main administration—this measure is not theirs. And they will not read the synopsis. They have not gotten into the habit. A journalist, who knows Academician Kapitsa well, once told me how Petr Leonidovich gave advice to Chairman of the Council of People's Commissars A. Rykov. The latter called him at a most inappropriate moment—on the eve of his departure for Leningrad, then for England. It was already impossible to change anything, but it was awkward to turn Rykov down. Petr Leonidovich honestly acknowledged this. Rykov asked him not to worry and to allow him to see the scientist off. Kapitsa thought that the discussion on the means of organizing Soviet science would take place at the station and arrived ahead of time. What his surprise was when the advice did not end with this. The chairman of the Council of People's Commissars got on the train, they discussed all night the question of the development of the sciences, which was most important for the country, while in the morning

they said goodbye, and Aleksandr Ivanovich returned by ordinary train to the capital. A fantastic event by present standards, is it not?

I do not remember educators, medical personnel, and agricultural specialists sharing the intellectual inquiry of the general assembly. Does the departmental order really interfere? It would be interesting to clarify this once entirely officially. And instead of the solemn line of the TASS report: "...the secretary of the Central Committee attended the assembly..." to write: "...and such and such people, who do not share the concerns about the development of our society, did not attend." It would be just and democratic.

For the present the speakers demonstrate to each other good awareness, a splendid knowledge of their own subject, and at times wit and are grieved by misfortunes, the reasons for the elimination of which in the majority of cases do not depend on those present. And for some reason they do not want to recall that there are also such reasons which depend only on them. The new presidium, most likely, will inherit the tradition of the annual business meeting of the members of the academy. And this is correct. But modern science has so many internal sores and the scale of their spread is so great that it is already entirely worthy of the attention of the highest scientific council of the country. Like before, for example, the wariness of Lysenkoism and its most typical manifestation—monopolism in science. If the 1948 session of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin, the ones similar to it, and the fate of N.I. Vavilov did not teach us anything, should Chernobyl, perhaps, become the last argument in the irreconcilable struggle against this evil? While how many more people live in science on the labor of others as coauthors, some, if they may be called that, scientific institutions are reminiscent of a crossroad of bandits: They will rob and utterly ruin. The academy, being torn between its two hypostases—a ministry of science and an Areopagus—to this day is pretending that there is nothing of the sort. There is. It is sufficient to read any editorial mail. The dramas have gone on for decades, the life of a researcher and his unique training and abilities have been abusively depreciated. The court is not helping, the scientific community, the only possible arbiter, is not intervening.

Is it worth being amazed that the prestige of the scientist in society and of knowledge in general is declining? The graduates of secondary schools are prepared to devote themselves to commerce, sports, and the service sphere, but just not to the search for the truth. It is possible to understand them. Open any newspaper or journal and you will be convinced into what this very search is turning.

The lack of protection of the scientist and the researcher, the possibility of incompetent interference in scientific work—whom should this worry? Only journalists? The Institute of History of Natural Science and Technology operates in the USSR Academy of Sciences. There, in

this history, there is very much that is instructive. While at the institute there are enough talented young historians and philosophers. Why not introduce a new useful tradition—at every assembly to listen to a historian of science or a philosopher. Corresponding Member of the USSR Academy of Sciences N.D. Ustinov, director of the institute, told me that such reports are traditional for the leaders of many governments, as a whole both the practical and the philosophical interest in this science in the world is very great. I myself also became convinced of this at the last international symposium on the history and philosophy of science. As well as of the fact that we have many interesting scientists of this direction, but their influence on education and on the interpretation of the current processes in science is extremely small and ineffective.

The academy should take the first step in increasing the prestige of this scientific discipline. In its own interests. While in order to relieve scientists with time of complex duties, it would be necessary to introduce such a subject in the secondary and higher schools. Not without reason do many fear that the current state of the secondary school in the immediate future will undermine the development of the basic sciences. In the search for variants for the new school the following hope also remains: Nothing so rapidly raises the level of our culture as acquaintance with the dramas of ideas and people. Then simply no one will associate with a person who casually lets fall: "these Sakharovs..., these Sobchaks...."

I see in the hall of the assembly Corresponding Member of the USSR Academy of Sciences Genrikh Romanovich Ivanitskiy. The Lenin Prize winner at the very peak of his scientific activity was expelled from the party and was relieved of the position of director of an institute only because, when fulfilling the decision of the Academy of Sciences and the State Committee for Science and Technology on work on perfluorane, he created the necessary conditions for a new laboratory and its director and a new direction of research. That is, he performed his immediate duties. The head of the laboratory died, and this is a separate story. While Ivanitskiy to this day does not know his blame, the members of the Bureau of the Serpukhov City Committee of the CPSU did not explain this to him when making the harsh decision. While the investigator for especially important cases of the USSR Procuracy, Antipov, is still engaged in the clarification of the circumstances. The investigation has dragged on so long that it is on the verge of getting into the Guinness book of records. While the scientist is forced every day at the institute and on the streets of the small academic center to encounter inquisitive and all other sorts of looks, and, I hope, you yourselves suspect how he is forced to feel. The communists of the institute by a majority of votes adopted a decision on the restoration of G. Ivanitskiy to the party. But the Bureau of the Serpukhov City Party Committee ignored this decision. They obtained the preparation abroad, a talented scientist committed suicide, he was able to fight for the idea

with whomever you like, but he lacked the strength to have the reputation of a criminal. Ivanitskiy is working. Could he really have worked that way?! What is the benefit and who benefits from such a scrupulous ascertaining of the amount of excessively consumed laboratory alcohol and the violation of the norms and technology in the production and use of the preparation? This question thus far is unanswered, and not the academy, which would be both edifying and logical, but the USSR Procuracy is discussing the answer.

The "brain drain"—a characteristic trait of these years—worries everyone. Academician V.Ye. Zuyev, while noting that our folklore was always advanced, cited a very observant parable: "The older generation is seeking money, the middle generation is rushing to the West, while the younger generation is rushing to the cooperative." The usual explanation is: There is no housing, the rates are low, and so on. Undoubtedly, such is the case. But the feeling is such that the trend threatening our science is not being studied by anyone and behind the statement of a fact there is a complete vacuum. I believe that not only poor social organization is forcing one to make such decisions, but so is the impossibility of realizing oneself as a scientist, of overcoming conflict, of proving the competence of one's work, and so forth.

No one disputes the necessity of the discussions, which are customary for the assembly, on the financial policy of the academy, on the fact that "provincial" and "capital" science are unequal, that it would be a good idea to influence education, and so on. But the main scientific council of the country has more than enough reasons to look after its basic wealth—the person of science. And this, perhaps, is the only means of the recovery and modernization of science.

Osipyan, Others Discuss USSR Academy of Sciences Reforms

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[Article by Vice President of the USSR Academy of Sciences Yu. Osipyan, Vice President of the USSR Academy of Sciences V. Kudryavtsev, and I. Makarov, chief scientific secretary of the Presidium of the USSR Academy of Sciences, under the rubric "Resonance": "The Academy of Sciences on the Threshold of Changes"; first paragraph is *IZVESTIYA* introduction]

[Text] The Presidium of the USSR Academy of Sciences discussed numerous problem publications of *IZVESTIYA* on perestroika in science, the most efficient organization of scientific research, and changes of the established academic structures of the training of personnel, as well as moral, ethical, and other problems of modern science. Executives of the presidium of the academy comment on the adopted and proposed decisions:

Vice President of the USSR Academy of Sciences Yu. Osipyan:

Many authors of the newspaper wrote that the election system at the Academy of Sciences is undemocratic. They probably meant the election of not only the organs of the Academy of Sciences, but also members of the Academy of Sciences. These are different things. For the present we are not proposing to make any changes in the procedure of electing new members of the academy. This is a quite developed system. All international societies and academies with established traditions act the same way. They elect new members to their body themselves and do not entrust this to any broader group. However, in order to avoid accusations of secrecy, we consider it necessary to conduct the discussion of candidates on a broader basis. For this academic and scientific councils, scientific societies, scientific and technical organizations, and so on should be enlisted at the first stage in the nomination and discussion of candidates.

The main thing that lies ahead is the bringing of the charter of the Academy of Sciences into line with the requirements of the times. Everything, about which I am now speaking, should be discussed at the general assembly of the academy tentatively in March. For example, we are proposing to hold the election of the president on an alternative basis. The candidates will be nominated in advance, and the general assembly of the academy by secret ballot will elect from them a president.

Then there is the presidium. It consists first of all of the president, the vice presidents, and the chief scientific secretary. This is the everyday executive power, the "government" of the Academy of Sciences. And it is presumed that it is necessary to establish it as a "government." The president will propose his "cabinet" to the general assembly. Here the existence of an alternative is optional. It is not worth imposing on the president his deputies. But at the same time these people should be acceptable to the general assembly, that is, if they do not elect someone in case of a secret ballot, the president should propose others for their place. And so on until a consensus is reached.

There are several members of the presidium, so to speak, by virtue of position. For example, physicists first of all should elect the academician secretary of the physics department. By secret ballot, on an alternative basis. And then he, who was elected by the general assembly, is admitted to the presidium. If the general assembly does not elect him, the physicists will propose another person. This is also a type of consensus.

And, finally, the members of the presidium without portfolio. It is proposed to elect them on an alternative basis as well.

It is necessary to bring into line the different elements of our charter. There is the statute on the department and on the scientific center. There much is at variance with

the general charter. There are several controversial questions of a general nature. Powers, which only the general assembly can grant, are needed in order to engage in this work—to write a new charter. Well, for example, in Paragraph 1 of the charter it is recorded that the Academy of Sciences is subordinate to the USSR Council of Ministers. This rigid paragraph implies that the academy is an element of the administrative system. But during the election of people's deputies it turned out that the academy has the status of a public organization. These are obvious contradictions. There are many similar examples. It seems to me that the academy should be an independent public organization, but it reports annually on the results of its activity to the Supreme Soviet or the USSR Council of Ministers. It is also expedient to give the Academy of Sciences an independent status because it often acts as an arbitrator. For example, in disputes it examines proposals before the making of decisions by the USSR State Planning Committee or some state projects. The newspaper also raised the question of abolishing the two types of membership in the Academy of Sciences: full members and corresponding members. We will discuss it. We will see which point of view triumphs. Diverse experience exists in the world.

Vice President of the USSR Academy of Sciences V. Kudryavtsev:

First about the basic unit of the academy—the institute. It was deemed inexpedient to have a common charter for all the scientific research institutions of the USSR Academy of Sciences. At the next general assembly the basic principles of the organization of the activity of the institute will be offered for discussion. Only the principles. The charter of the institute is drawn up locally by itself with allowance made for its specific nature, the scientific direction, the production base, and so forth.

The management of the institute will also be more democratic. Particularly in large collectives. Not a director, but a directorate, a collective organ made up of executives of the leading subdivisions of the institute. If the scientific collective considers this expedient, the post of director, as they do at many foreign scientific centers, will be held by turns. Other forms of management are also possible. Let the institute itself decide what procedure is more suited.

The presidium considers it necessary to reinforce the general assemblies of the departments with doctors and even candidates of sciences. This would take place on the basis of an election, according to a specific quota, for participation with a deliberative voice in the settlement of all questions of scientific life. The departments discuss programs of scientific research and important projects and plan business trips. Without the participation of the scientific community at large, as the newspaper correctly noted, activity of this sort will not be effective.

Doctor of Economic Sciences V. Lazovskiy and other authors wrote that the case, when not scientists, but the

apparatus makes decisions without monitoring on the part of the scientific community, raises alarm. Voluntary councils attached to the administrations of the presidium for the most important questions of intrascientific life: Personnel policy, the competitive financing of basic research, capital construction, and so forth, have now been formed.

The practice, when decisions of the presidium prove to be a surprise for the community, was justly criticized. The decision was made to discuss fundamental questions extensively already at the stage of drafts.

I share the opinion of Academician Aleksandrov on the underrating of the humanities direction. Dmitriy Sergeyevich Likhachev also wrote about this. The humanization of science and, in this connection, the increase of the role of the social sciences are necessary. For the present the approach to them is exclusively pragmatic: give advice on how to act in Transcaucasia and what to do somewhere else....

But the recommendations will be superficial or it is impossible to give them at all without the development of basic knowledge. But basic research is being developed poorly in the social sciences. This is one of the most urgent questions for the academy.

In modern science, unfortunately, there are very many conflicts of different kinds, and the newspaper is correct in asserting that the scientist is poorly protected. The document with the provisional title "The Law on Science" was prepared five years ago at the Institute of State and Law of the Academy of Sciences. In it there was a large section on the status of the scientific worker, which was drafted on the basis of recommendations of UNESCO. But its fate is unenviable: They sent it to the USSR Council of Ministers, that was the end of it. We intend to make the necessary adjustments in the document and to propose again that it be adopted.

I. Makarov, Chief Scientific Secretary of the Presidium of the USSR Academy of Sciences:

Is the further increase of the intensity of international contacts possible? We are seeking every opportunity, but for the present obstacles, which are hard to surmount, are rising on this path. The point is that the exchange of scientists, owing to the inadequate foreign currency financing of the Academy of Sciences, is taking place mainly on an equivalent basis. While this, of course, is limiting our possibilities.

At the end of last year after the adoption of the new procedure of the departure of Soviet citizens the USSR Academy of Sciences significantly simplified this process, moreover, it assumed consular functions. Previously when registering any foreign business trip it was required to gather 13 signatures of various executives and to draw up a significant number of documents. Now this information has been reduced to a reasonable minimum. The date of the registration of departure abroad

now depends only on the dates of the receipt of entrance visas to one country or another.

About 100 journals, which are published by the Academy of Sciences, are translated abroad, but the All-Union Copyright Agency coordinates this activity. The question of granting us the right to the independent publication of our works abroad—from monographs to journals—is now being worked on. Incidentally, if the terms of the All-Union Copyright Agency seem more tempting to someone, the Academy of Sciences will not create any obstacles.

Another problem, which is mentioned in the publications of *IZVESTIYA*, is the relations with the Main Administration for Safeguarding State Secrets in the Press. We believe that professionals should themselves be responsible for their work, but we do not intend, of course, to betray secrets. There are reassuring changes in this direction. The report on the activity of the USSR Academy of Sciences during 1988, which previously was always accompanied by the stamp "for official use," has just now been published in the open press. We hope that the procedure of xerox copying materials, which for the present greatly hinders the normal work of scientists, will be significantly simplified.

At present we are working on another problem—the organization in the presidium of the Academy of Sciences of a modern information system, which will make the work of the staff significantly more efficient. For this the Akademinform special information network, to which banks of scientific and experimental data will be hooked up, is being established, which will make it possible to organize efficient two-way information exchange with our foreign partners.

Marchuk Interviewed on Improving Soviet Science
907A0157A Moscow *PRAVDA* in Russian 5 Mar 90
1st edition p 3

[Interview with President of the USSR Academy of Sciences Academician Guriy Ivanovich Marchuk, by I. Mosin, under the rubric "The Academy of Sciences: Its Problems and Fate": "The Right To Seek. A Conversation With President of the USSR Academy of Sciences G. I. Marchuk"; date and place not given; first paragraph is *PRAVDA* introduction]

[Text] The large academy is living in expectation of serious changes. The ever intensifying contradiction between the needs of society for new ideas, solutions, and the interpretation of the present complex phenomena and the ability of science to meet them urgently requires its own resolution. At the forthcoming traditional March General Assembly of the USSR Academy of Sciences, scientists have to take a number of steps that are called upon to provide a new stimulus for the development of basic science. President of the USSR Academy of Sciences Academician G.I. Marchuk answers the questions of the editorial board.

PRAVDA: Guriy Ivanovich, apparently, before proceeding it is necessary to attempt to realize what today is preventing basic science from being developed robustly. What trends have begun to develop here under the influence of the new currents?

G. I. Marchuk: Indeed, the roots of many of our current problems lie in the past. It is necessary to acknowledge that although for long years the need for the acceleration of scientific and technical progress was declared, real life did not need it. Hence there emerged the attitude toward science as something secondary, the consequences of which we are also feeling to this day.

During this period science experienced several strong shocks, from which it has not been able to recover up to the present. The first blows were struck by Lysenkoism and the persecutions of cyberneticists. I believe that it is not necessary to say what a complicated situation we have today in these fields of science. The next blow was connected with the banning of the combining of teaching jobs by scientists at higher educational institutions. The vital connection between academic science and the higher school was broken. The influx of talented young people into science weakened. Today this ban has been lifted, but all the vacancies at higher educational institutions have long been occupied. And, finally, we experienced another shock when by the voluntaristic decision of the government in the early 1960's more than 100 academic scientific institutions were transferred to sectors. As a result positions in the development of advanced base technologies in machine building, chemistry and chemical technology, power engineering, and computer technology were lost.

In spite of certain efforts in recent years on the stimulation of scientific and technical progress, the desired change has not occurred. The reasons? The main one of them consists in the fact that the national economy as before does not need new ideas, technologies, and developments of scientists. It is necessary to clearly understand that without this need there cannot be a profound, fundamental revolution in science, just as in society itself.

However sad, in spite of all the declarations about increasing the role of basic science, it continues to be financed according to the remainder principle. But, after all, 72 percent of the doctors of sciences and 61 percent of the candidates of sciences work precisely here.

But money in itself, especially today, is still not everything. Instruments, reagents, and other equipment should be allocated against it. In our country such a situation has formed that more than 80 percent of these resources have been and are being invested in sectorial science. In short, the situation is such that basic science, figuratively speaking the brain of the country, its intellectual potential, is working under the conditions of a permanent shortage. Is it legitimate given such an attitude to demand from basic science revolutionary ideas

and new breakthroughs? Although the government has allocated to us the maximum of what it could.

For a thorough understanding of the situation it is also necessary to speak about the trends that have appeared already in our times in connection with perestroyka. A gap between the sectors of physical production, sectorial science, and basic research has appeared and is growing. Whereas previously it was possible, although poorly, to give effective developments a start in life and in practice by plans on new equipment, which existed in every ministry and department, today they simply do not exist. But for the present there is also no economic interest of enterprises in innovations nor any mechanism of their introduction. Moreover, under the conditions of a deficit economy sectors are simply ceasing to invest assets in basic research. The majority of enterprises are living for immediate interests and are giving little thought to the future.

Other trends, which make it incumbent to ponder in earnest, are also arising. There is the real danger, judging from the experience of other countries, that with the introduction of new procedures on entry and departure for aboard a brain drain will begin. The situation with material and technical supply continues to deteriorate. However paradoxical, today in academic science hardly anyone wants to become completely free. Reality is such that if you acquire freedom, you will lose resources and funds. With the changeover of regions to cost accounting there are the tendencies to cease the financing of themes that are of all-union importance. Locally they want regional science to work only for their needs. The proposals, which we will submit to the general assembly, are intended precisely to lay the foundation for the building of academic science on new financial, organizational, management, and resource principles.

PRAVDA: Will the outlined reform of basic science not develop into just another redistribution of the spheres of influence among specific groups of scientists, which exist today? Do you remember how it was with certification? They intended to get rid of loafers, but the powers that be by means of this lever expelled the dissenters.

G. I. Marchuk: The years of perestroyka have pushed many people to the understanding that all initiatives should have a reliable foundation. I am certain that the immediate implementation of the entire formulated program would lead to the opposite result: the slowing or even the actual elimination of our basic science in the country. Unfortunately, we abound in such experience.

The peculiarities of the present economic situation are such that we actually have, for example, four types of ruble: cash, noncash, foreign exchange, as well as another one, which is backed by funds. They are not equivalent to each other and cannot be converted from one to another. A wholesale trade market, which would make it possible to back monetary assets with instruments, materials, and services, is lacking. Separate, completely free

institutes in the present system can hardly work efficiently. For it is a fact that now the USSR Academy of Sciences is living with a deficit of 157 million rubles. True, much has already been done on the level of assistance to us by the State Committee for Science and Technology, and the Ministry of Finance has assured us that it will be possible to cover our deficit. We are relying on this.

But the present transitional situation cannot be maintained indefinitely. The cost accounting economy sooner or later will begin to operate. And basic science should be ready for this. All our assumptions will take effect and will be filled with life as society advances and new relations mature in it. In reality the proposed reform of science is a program for the future.

I believe that first of all we need a law on state scientific and technical policy. The priorities in the development of science and technology and the responsibility of the state for their realization should be established in it. The basic principles on funds for the financing of science have been formulated, the status of statewide programs and orders for the most important research and development has been specified, the priority nature of basic research has been indicated, a system of the independent scientific and technical examination of various projects has been established. Finally, the legal and financial interrelations of the state and such a sphere of it as science have been specified.

The passage of a law on intellectual property and addenda to the law on the unified tax system is also of the greatest importance. These addenda, according to the proposal of the USSR State Committee for Science and Technology, should specify the terms of the preferential taxation of assets which are invested in the development of science. And, finally, we need to formulate legal principles that define the status of both the individual scientific research organization and each scientist.

But these are, so to speak, basic laws, which are necessary for the establishment of harmonious interrelations between science and the state. At the general assembly we have to examine a large number of questions that concern changes of our intrascientific life.

There is often debated the question: What is our academy—a public organization or a ministry of science? In what direction is it to develop further? We believe that our academy will gradually develop into a public organization. But this is a complex and quite contradictory process, which is connected with the overall course of perestroyka. The coordination of research, the determination of the prospects of the development of science, forecasting and analytical activity, the examination of projects, and personnel policy should become its main task.

In recent years we have tried to give all the work of the Academy of Sciences greater dynamism, by relying on

democratic elements. This is the organization of competitions for the obtaining of priority allocations and the electivity of executives. I am certain that we also need to go further along the path of the steady increase of the independence of academic institutes. According to the idea, the network of our organizations should acquire mobility, which enables it to react adequately to the emergence of new scientific and social needs.

For this purpose the document "The Principles of the Organization of the Academic Institute" will be submitted to the general assembly. On its basis every institute should formulate the charter, the structure, and the internal organizational mechanism, which conform to the greatest extent precisely to its specific nature. The collective of laboratories and departments is becoming more and more the basic motive force of science. It is necessary to admit that long ago many of our scientific collectives of many thousands became ripe for disintegration. This process in reality has begun, and it is not worth checking it. In the United States and the FRG many institutes consist of 50-100 people and are producing excellent results. Of course, there they are splendidly equipped. We must also find the optimum organizational structure, based on each specific case.

The Academy of Sciences, it seems, should also have the right to settle independently, bypassing state organs, questions of the establishment and elimination of scientific institutions.

In the direction of further democratization the amendment of the charter of the USSR Academy of Sciences will also take place. In my opinion, the charter should promote the improvement of the social, economic, and legal conditions for free research inquiry. In particular, in the opinion of the commission of the USSR Academy of Sciences for the amendment of the charter it is necessary to secure the existence of an alternative in case of the election of all management organs of the academy, including the president. To permit the president himself to select for himself a team made up of vice presidents and the chief scientific secretary. But the right of its approval should belong to the general assembly. These are very correct proposals.

The councils of the Academy of Sciences for the basic directions of activity—the planning and organization of research, financing, capital construction, material and technical supply, the development of the social sphere, international cooperation, and health care—which have been established on a democratic basis, will make it possible to bring academic science up to a new level of self-management. The main goal of the establishment of the councils is to enlist the scientific community in the settlement of all the most important questions of the life of the academy and to place under their control the activity of the management staff. The regular rotation of members of the councils will serve as a reliable basis against abuses of power, scientific monopolism, and cliquishness.

We are also seeking new approaches in the area of the financing and resource supply of basic science. Today it has become clear to everyone that academic science is a specific area of social activity. It cannot and should not compete with other sectors for resources and finances. It is necessary to switch to the procedure of state support, which has been adopted throughout the world, when legislative organs make the decision on what portion of the annual budget can be allocated for the development of science. I believe that a two- to threefold increase of the spending on basic research would make it possible to carry out the qualitative renewal of the scientific potential already in the next few years.

It is also necessary to eliminate the possibility of the one-man disposal of all academic resources. It is necessary to form the most different funds, to which any scientist and collective can turn with their proposals. In particular, it is proposed to establish a basic research fund, an interbranch applied research fund, and the corresponding sectorial funds.

But along with state subsidies we are entirely able to and should earn money by sending domestic science-intensive products to the world market. The number of western firms, which are interested in our ideas, is still increasing, and quite rapidly. This interest, incidentally, is the best response to the assertions of skeptics that domestic science has lost its positions and has lost international prestige. Our proposal on the establishment of an international joint stock association of scientific instrument making is now under consideration by the government. It is anticipated that the annual production volume will come to several hundred million rubles. These instruments will be used to a significant extent for the retooling of the USSR Academy of Sciences.

PRAVDA: Today many people quite justly link our social, political, and interethnic problems with the stagnation in the social sciences. We are proceeding along the path of democracy literally by feel, getting bumps at every step. Unfortunately, I do not see any fundamental changes in this sphere of science.

G. I. Marchuk: You are correct, an extremely difficult situation has formed at social science institutes. To a large extent this is a consequence of technocratism, which dominated for long years, and contempt for humanities culture. Recently the presidium of the academy considered the proposals of the social sciences sector on the correction of the situation in this area. The decision was made to allocate here additional finances and to supply social scientists with advanced computer hardware. There are proposals on the organization of an institute of the socialist market and an analytical center of the USSR Academy of Sciences for problems of socioeconomic and scientific and technical development. It was also decided to turn over the building of the present presidium of the USSR Academy of Sciences for the organization of the Center of Humanities Knowledge imeni B.R. Dashkova. But this is merely the start of the turn toward the social sciences.

PRAVDA: Guriy Ivanovich, a last question. There are a large number of problems, but what worries you personally as president, a scientist, and a person in science today most of all and is, as they say, mental anguish?

G. I. Marchuk: The still continuously deteriorating material status of academic scientists. We are losing people, who will work in the new buildings and at the computers? We have submitted to the government a proposal on the change of the remuneration of the labor of scientists and their retirement security. And for myself personally I consider this task number one.

Marchuk Interview on Formation of RSFSR Academy of Sciences

907A0146A Moscow POISK in Russian No 5 (40), 1-7 Feb 90 pp 1, 2

[Interview with President of the USSR Academy of Sciences Academician G. Marchuk: "The Choice Has Been Made"; date and place not given; first three paragraphs are POISK introduction]

[Text] The Presidium of the RSFSR Supreme Soviet adopted the Ukase on the establishment of the Academy of Sciences of the Russian Federation and commissioned the Council of Ministers to implement practical steps on its formation.

This official announcement was received in scientific surroundings by some scientists with enthusiasm and by others with a certain degree of skepticism. In the Presidium of the USSR Academy of Sciences the discussion took place in heated debates. Some scientists believe that the new academy is being approved too hastily, before the prospects of the development of the Russian Federation become clearer. For in the republic not only its own academy of sciences, but also other structures—a Communist Party, Komsomol, trade unions...—do not exist. Is it worthwhile for science to run in front of the others? What positive result will we achieve, having established the RSFSR Academy of Sciences? What are the prerequisites for that?

Today at the request of the editorial board President of the USSR Academy of Sciences Academician G. Marchuk answers these questions.

G. I. Marchuk: First of all let us note that not the union academy, but the Presidium of the RSFSR Council of Ministers is making the decision on the establishment of the republic academy. Our task is to voice our opinion on this account and to propose principles of the establishment of the new academy. We repeatedly discussed these questions in the Presidium of the USSR Academy of Sciences and reported our point of view in all details to the Presidium of the RSFSR Council of Ministers—we even submitted there the verbatim report of our last meeting.

During it we were once again convinced that the lack of sovereign state institutions in the Russian Federation

has adversely affected its development. Deputy Chairman of the Republic Council of Ministers V. Zakharov cited the following figures: The RSFSR in the per capita production of national income is in first-second place among the 15 republics. But in the share of the national income spent on social needs it is in last place. And it is understandable why. For union organs "serve" it, releasing everything to it nearly last of all. The process of state reorganization is obviously gravitating toward federalization, but in no event toward centralism. So that the logic of establishing the republic Academy of Sciences is not at variance with the political movement.

We, scientists, are worried first of all about whether science will be better off because of the establishment of the new academy. It does not make sense to organize a structure that is similar to the prevailing one. This was clearly stated by the scientific community at all stages of the discussion of the problem. Incidentally, POISK published a report on one of the meetings of this kind, which were held in Novosibirsk, while several versions of the establishment of the new academy, including the concept of Doctor of Historical Sciences A. Degtyarev, which received support, were discussed in the press. A working group, which was established under the Commission for Science and Technology of the RSFSR Supreme Soviet, elaborated proposals on the basic principles of the organization and functioning of the Academy of Sciences of the Russian Federation and specified its goals and tasks.

All the members of the presidium were convinced that it is extremely short-sighted to destroy the established structures of the "big" Academy. To withdraw from it strong scientific research collectives means to lose the basic reserve. But why assemble the republic academy out of the other weak scientific subdivisions? They decided to abandon traditions and to attempt to depict the new academy as a system without its own institutes. Its activity will be based on the scientific research institutions that are financed through the RSFSR Council of Ministers. Today these are the three regional departments of the USSR Academy of Sciences—the Ural, Siberian, and Far Eastern Departments, as well as VUZ [higher educational institution] and sectorial science of the Russian Federation. It is also proposed to convert the scientific centers of the USSR Academy of Sciences in the northern, central, and southern zones of the European part of the RSFSR to "dual" management with financing through the republic Council of Ministers.

POISK: Including Moscow, Leningrad, and their oblasts?

G. I. Marchuk: No, these regions will not become a part of the Academy of Sciences of the Russian Federation, inasmuch as they have the administrative status of union republics and are financed directly by the USSR Council of Ministers.

POISK: And how will the main body of personnel of the new academy be formed?

G. I. Marchuk: In the document of the working group it is proposed to elect the full members of the academy and the corresponding members from among the prominent scientists who work at any organization located on the territory of the RSFSR. But since the new academy is called upon to further not only priority research, but also the implementation in the RSFSR of a unified scientific and technical, ecological, economic, social, and cultural policy, it would be correct if representatives of scientific collectives of union subordination were also elected to the Russian Academy of Sciences: The interaction and mutual understanding of union and republic science would emerge.

POISK: Does it not seem to you that the structure of the new academy—without institutes—will be a heavy burden of new organizational work on the associates of its personnel base—these are the researchers from the Russian territory? Is this double burden within the power of scientists? Will it not do direct harm to serious work?

G. I. Marchuk: I believe that exactly the opposite will happen. At one time the spheres of influence and the financing of academic, VUZ, and sectorial science were separated. This proved to be a major miscalculation in the scientific and technical policy of the country. The Academy of Sciences of the Russian Federation can and should become the new organizational form, which by means of special-purpose financing will ensure the integration of Russian scientists in its regions.

In our plans on perestroika in science considerable space is now being allotted to the establishment of interdisciplinary scientific research institutions, collective-use centers with single-design equipment, information banks, and regional interdepartmental organizations, which are conducive to the acceleration of scientific and technical progress. Given the traditional, routine structure of the organization of science they are carving their way with difficulty. In my opinion, the new approaches will help these forms to become firmly established in our life.

However, what has been said does not at all mean that all the old experience will be discarded. At one time we learned a lot when forming the Siberian, Ural, and Far Eastern regional departments. Taking into account what had been done, it was decided to form the organizational structure of the RSFSR Academy of Sciences according to the principle of economic zones. It is proposed to distinguish 11 of them—the Northern, Northwestern, Central, Volga-Vyatka, Central Chernozem, Volga River, North Caucasian, Ural, West Siberian, East Siberian, and Far Eastern zones. Regional scientific coordinating councils of the RSFSR Academy of Sciences, of which elected representatives of all three types of science, members of the Russian Academy of Sciences, and

founding members of the new academy will become members, have to be established in each one.

Immense work on the establishment of the Academy of Sciences of the Russian Federation lies ahead. And today it is already clear: The effectiveness of the reforms being carried out in the republic in many respects depends on its success.

From the editorial board: In the next few issues of POISK we will tell about the plan of the establishment of the new academy in greater detail.

Role of Central Planning in S&T Progress

907A0153A Moscow *PLANOVYE KHOZYAYSTVO*
in Russian No 1, Jan 90 pp 61-70

[Article by A. Sukhov, head of a department of the Scientific Research Institute of Economics of the USSR State Planning Committee, and V. Fedyushkin, chief of a subdivision of the USSR State Planning Committee, under the rubric "Towards the Plan of the 13th Five-Year Plan": "The Prospects of the Centralized Planning of Scientific and Technical Progress"]

[Text] Centralism and economic independence are a vital question of economic reform and the transformation of scientific and technical progress into a main factor of the development of society. What is the role of the center in the management of scientific and technical progress under the new conditions of management? The 13th Five-Year Plan is not far off, and an answer should be found already now.

At present the opinions exist that the centralized planning of scientific and technical progress should be curtailed or nearly curtailed, inasmuch as economic interests are its main motive force, while these latter interests are formed by the economic mechanism, which generates cost accounting interests and evaluations of the effectiveness of decisions being made, which are objective from the social and economic points of view. Arguments of this sort have a real basis, and one must not ignore them. It is necessary to find and substantiate the boundaries of truth.

Thus, let us examine the expedience of the functions of the centralized planning of scientific and technical progress and the economic framework of their implementation under the conditions of the new economic mechanism. It is possible to break these functions down conditionally into two types: the formulation of the state order for general national economic problems of scientific and technical progress and the achievement on its basis of priority results; the establishment of a system of benefits and sanctions, which stimulate scientific and technical development in the priority directions, as well as the economic conditions of economic activity in the sphere of scientific research and experimental design work. Before analyzing the first of them—the basic subject of our examination—let us specify briefly the

principles of the state formation of the economic mechanism of the sphere of scientific research and experimental design work.

For the objective regulation of the scale and directions of the development of applied science its economic practice should be as close as possible to the cost accounting conditions that have been established for social production. In applied science, as nowhere else, equal conditions of management and the minimum benefits are important. It is advisable to establish benefits for the final product, that is, for the results of the work of the sphere of social production, which is the client of the scientific product, and only through it can science indirectly derive benefits. It is important that the principle: the great effectiveness of one direction or another of scientific research and experimental design work, including as a result of benefits for the client—the great interest of the client—the great possibilities of the latter to stimulate science, would be in effect. The consumer of the scientific product knows better what he needs from science and what kind of science he needs. The state should not establish benefits for applied science by bypassing the client.

One should not involve basic science in cost accounting. For the purpose of retaining its highly skilled personnel it is necessary to provide it through the state order with revenues and a wage, which are not lower than the level of cost accounting science.

The functions of planning with respect to the achievement for the national economy of priority results on the basis of scientific and technical progress and the state order are implemented by the generation of new scientific and technical developments, their approval, and the expansion of the use of effective innovations. It is safe to say that in case of any economic mechanism these functions to one degree or another will be reserved for the centralized planning of scientific and technical progress. The question is, what are their boundaries under the new conditions of management, the methodology of implementation, and the real filling with assignments, indicators, and, what is the main thing, levers of the state plan?

Scientific Research and Experimental Design Work and the State Plan

The planning of scientific and technical progress should pursue two basic goals: the creation of a common scientific and technical potential of the development of the national economy and its full-fledged use of all the economic subjects and spheres of ownership. The common character of this potential is governed by its applicability in the greater part of the economy (basic and intersectorial applied research), great economic effectiveness, and interest in the introduction of the achievements of science and technology.

The prerogative of the centralized planning of scientific and technical progress is not only the creation of a common scientific and technical potential, but also the

formation of the prerequisites for the accomplishment of specific priority tasks of social and economic development on a new highly efficient scientific and technical basis. In other words, first of all a frontal nature for the building of a common scientific and technical foundation, which ensures the effective development of the national economy by the subsequent bringing of the components of this foundation on a cost accounting basis up to economically effective forms of the materialization of scientific and technical progress and the large-scale introduction of the latter, is characteristic of the planning of scientific and technical progress. It is important to devote particular attention to the assurance of the efficient and socially oriented reproduction and use of state national property both in the form of possessions and by right of disposal, first of all within the state order.

In the process of planning the state is obliged to act as a real owner, who pursues clearly realized goals that are accomplished on the basis of highly effective scientific and technical achievements. The function of planning with respect to the building of the scientific and technical foundation of the entire economy will be fully realized, if the elements of the latter have been brought up to a level of efficiency, which is suitable for the making of economic decisions on the advisability of their further modification and on their use on a cost accounting contractual basis between enterprises and organizations outside the state order.

An orientation toward the accomplishment of the socially top-priority tasks of social and economic development on a new highly efficient scientific and technical basis is also characteristic of the planning of scientific and technical progress. As a result the abstraction of the concept of such, for example, priority directions of scientific and technical progress as electronization, automation, and so on becomes inadmissible, inasmuch as they presume the accomplishment of a specific socioeconomic task. Such an approach excludes a frontal nature in these directions themselves and makes it possible to narrow their boundaries, to purposefully concentrate state assets, and thereby to increase the effectiveness of the use of the latter.

A different approach is advisable to the distinction of the priority directions in the area of basic research. Here the predominance of the principle of a frontal nature is permissible, while the priorities can be less pronounced, although, other things being equal, the research, which directly influences the accomplishment of the priority tasks of socioeconomic development and the corresponding directions in the applied area, should enjoy priority.

The main concern of state organs of management is the promotion of the expansion of the production goods and the performance of services, that is, the formation of cost accounting stimuli for the emergence of the corresponding needs and the rapid development of capacities, which as a whole exceed these needs, including on the

basis of the state order. The functions of the management of scientific and technical progress with respect to the building of a common scientific and technical foundation and the accomplishment on this basis of the priority tasks of social and economic development appear as a task of centralized planning only in the area, in which it is not implemented by enterprises and organizations due to their lack of interest, the limitedness of assets, and the uncertainty of the anticipated results.

The ability of cost accounting enterprises and organizations to carry out (finance) independently the further development and introduction of scientific and technical innovations, which in the form of primary achievements were the result of the fulfillment of assignments of the state plan on science and technology, serves as the most important economic boundary of the extension of the functions of the planning of scientific and technical progress. The limitations of the sphere of the economic activity of the cost accounting unit on the implementation of scientific and technical measures, which are connected with its interest (or lack of interest), the lack of assets, and risk, act as the common boundaries of the extension of the functions of the state regulation of scientific and technical progress.

The lack of interest in implementing individual scientific and technical measures always existed and will exist, first of all because cost accounting relations do not encompass and never will encompass all the vital activity of society. Even under the conditions of a developed market economy a portion of the most important units of social and economic life are removed from the sphere of pure cost accounting and the motivation of behavior according to the criterion of the maximum profit. In particular, this concerns the molding of the individual and the training of manpower resources, medicine, ecology, defense, and the solution of the problems of natural resources and the changeover in the future to their substitutes.¹ Moreover, many other aspects of social and economic life, which provide the socially necessary level of consumption and social security, which is common for everyone, have also been partially removed from cost account. This is due to the prospect of the depletion of energy resources, which threatens in the future, for which it is necessary to prepare in advance, since the changeover to new and alternative energy sources, the use of which at present is uneconomical, requires new knowledge and significant capital investments and cannot be accomplished in a short time.

Cost accounting interests are always of a current nature and do not take into account all the long-range consequences. Precisely the long-range aspects of economic activity from the standpoint of scientific and technical progress should be the prerogative of its centralized planning. It is called upon to encompass the social aspects of scientific and technical progress, which exist,

first of all, outside enterprises and the production process proper, as well as, as a rule, science- and capital-intensive spheres of the use of highly economical technologies and the consumption of new resources, which are alternative to their types, which are very limited and are being rapidly depleted. The state is obliged to actively support enterprises and organizations with its centralized resources in those instances, when they are interested in implementing the priority directions for society of scientific and technical progress, but are experiencing here a shortage of cost accounting assets.

The examined principles of the specification of the functions and boundaries of the centralized planning of scientific and technical progress are of a common nature for all its stages—from scientific research and experimental design work to the large-scale use of their results.

The Plan, the Approval and Use of the Achievements of Science and Technology. The Extent of Centralism

An important function of the centralized planning of scientific and technical progress is the approval of the achievements of science and technology. It is carried out in the form of a state order which the granting of benefits to enterprises that are the first to introduce some developments or others.

The ultimate goals of this function consist in the objective evaluation of the socioeconomic effectiveness of the achievements of scientific and technical progress and the making of the corresponding information available to all interested enterprises and organizations, as well as in the making of a decision of the advisability of the expansion and use of approved innovations within the state order.

The achievements of science and technology, which were developed in accordance with assignments of a state order, as a rule, should also be approved within the framework of it. Such a state order is issued for the most part for scientific and technical developments, the approval of which is expensive and which have been obtained as a result of the fulfillment of a state order of a higher scientific level.

The new economic mechanism envisages the gradual abandonment by centralized planning of the support of the physical and material balance by administrative methods, since it is impossible to accomplish this by centralizing only a small portion of the assets which are circulating in the national economy. Such a function can retain its importance only in those spheres of the economy, in which the share of the state order in the volumes of production and capital investments is very high, for example, in the extractive sectors.

Under the conditions of the gradual abandonment by the state of the balancing of production capacities by means of centralized capital investments and the greater and greater transfer of this function to the cost accounting unit these assets should be switched more extensively to the framework of the state order on scientific and technical progress and be examined precisely from its

point of view. Given such an approach the state order for the placement of production capacities into operation can be regarded primarily as a state order on scientific and technical progress for the purpose of resource conservation, which has the form of capital construction and the placement of capacities into operation on a fundamentally new scientific and technical basis.

With respect to the role of centralized planning in the expansion of the use of the achievements of science and technology there is no doubt that the state within the limits of the assets at its disposal is obliged to spend them most efficiently, including by the use of effective technologies and developments in the plans of the development of capacities. But the state itself can regulate the receipt of these assets. The question of their necessary amount and the division of all national economic resources, first of all the accumulation fund, into ones that are and are not centrally allocated, including for the purposes of scientific and technical progress, arises.

The criterion of the solution of this problem consists in the following. If the state is capable of using resources more efficiently for the achievement of some socioeconomic results or others than the cost accounting unit is, or the latter is incapable of achieving them, the corresponding amount of assets should be centralized. And vice versa. If during the period under review the state consumed resources more efficiently than enterprises and organizations did for analogous purposes and directions of development, this means that during this period the amount of centrally allocated assets was unobjectionably set too low. And vice versa. The extent of centralization is objective, if the effectiveness of the use of centralized and noncentralized assets is equal. This principle is also fair with respect to the centralization of assets for centralized capital investments and with respect to the scale of the use of base resource-saving technologies and other achievements of science and technology, including on the basis of a state order.

Many economists hold the views that the decentralization of the management of the economy and ownership both with respect to property and by right of disposal is necessary for the acceleration of scientific and technical progress. This is actually important, but it is necessary to bear in mind that in case of a change of the pace of scientific and technical progress the level of centralization or, accordingly, decentralization should objectively also change. The decrease of the pace leads to the reduction of the needs of enterprises for assets for the modernization of the production apparatus. Consequently, the process of decentralization should be linked not only with the change of the dynamics of scientific and technical progress in the macroindicators of development, but also with the structure of the latter by spheres of the national economy.

The a priori, permanent, and, what is the main thing, abstract priority of the division of assets into ones that are and are not centrally allocated, without attachment to specific problems and spheres of the national

economy, is not justified. The specific solution of this problem depends both on the efficiency of the work of enterprises under the new conditions of management and on the quality of centralized planning and management. Let us note that the assertions of the supporters of decentralization about the lower effectiveness of state investments as compared with noncentralized investments are illegitimate. Practical experience shows the untenability of such a point of view, while the argument in the sense of "on the average" is irrelevant here.

The criterion of the degree of centralism is the scale of the need for resources for the tasks of social and economic development, which are urgent and are being accomplished on the basis of scientific and technical progress, in the area of their elements that go beyond the expedience of market relations or the objectivity of cost accounting relations from the standpoint of society as a whole. In the sphere of the development of science and its financing the ratio between the amounts of centralized and noncentralized national economic resources, which are annually placed into economic circulation by right of disposal, can serve as such a criterion. In other words, the planned estimated division of capital investments into centralized and other capital investments should accordingly affect the planned amount of state budget financing of science.

It is important to take into account separately the share of the assets for the development of the basic sciences as a part of the expenditures, which are common to all forms of property, for the purposes of social reproduction on a new scientific and technical basis.

In our opinion, the formation by statistics of information, which makes it possible to evaluate the intensity of the established level of the centralization of national economic resources as a necessary condition of the optimization of the system of taxation, is an important direction of the development of statistics.

Cost Accounting Interests Versus the Goals of the State

What is one to do if enterprises reject some achievements or others of science and technology? What is one to regard as correct—the cost accounting behavior of production collectives, which do not use innovations, or the data, which the state has, on the great socioeconomic efficiency of the latter?

If the economic mechanism gives rise to objective, optimal economic solutions of the cost accounting unit and forms the corresponding economic evaluations of the versions of solutions, the centralized aim at the use of the achievements of science and technology is unjustified, since in essence it is equivalent to forcible introduction in the economic system of a foreign rejected element. Such an aim is expedient only within the framework of the coverage by cost accounting relations of the corresponding aspects or processes of reproduction and the consideration by these relations of the long-range consequences of current decisions, which was spoken about above. If such a condition does not exist, it

is possible to expand the use of scientific and technical achievements by the centralized formation of special elements of the economic mechanism, which create a cost accounting interest in the use of innovations. Of course, this should not be accompanied by an exclusive orientation toward individual specific developments. Such elements of the economic mechanism are capable of stimulating the priority application of a set of achievements of science and technology, which are identical in the nature of the effect on the efficiency of production and its structure, for example, on the decrease of the resource-output ratio on selected, including highly utilized, types of resources in specific spheres of the national economy.

The creation of a cost accounting interest of enterprises in some actions or others can have for the state a fee or nonfee form. The former is characteristic of the granting of tax breaks, while the latter is characteristic in case of the establishment of a fee for resources or the regulation of prices, including for resources, the change of the expenditures on which makes the use of the achievements of science and technological profitable from a cost accounting point of view. The centralized expenditures on the formation of the cost accounting conditions for the expansion of the sphere of their application should be taken into account when selecting state scientific and technical projects on the basis of the estimates of their effectiveness as elements of the cost of these projects.

The creation by the state of cost accounting stimuli for the introduction by enterprises of specific groups of achievements of scientific and technical progress can be regarded as a temporary step, which will not be implemented, if in the future objective changes on the basis of the laws of the market economy, which with the passage of time make these special stimulating steps unnecessary, are not expected. In other words, the partial modifications being made by the state of the prevailing economic mechanism for specific purposes, including by the use of the achievements of science and technology, in the long run should not violate the law of the formation of the value of all the elements of the reproduction process.

One of the main functions of centralized planning and management consists in the forecasting of social needs and sharp changes of the factors of the formation of value, which have a substantial influence on the structure and proportions of the development of the national economy. This is necessary for preparation in advance for such changes and for the adaptation of the economic system to them, so that its functioning under the new conditions would be most efficient and would not allow social and economic crises. What has been said applies first of all to the science- and capital-intensive and very inert spheres and processes of the national economy, especially everything that directly concerns man, his consciousness, living conditions and development.

In instances, when production activity is evaluated unobjectively, the functions of centralized planning and management should reduce, first, to the modernization

of the economic mechanism, so that enterprises would recognize the advanced achievements of scientific and technical progress as efficient, and, second, to the systematic creation of economic conditions, which are self-reproducing in terms of the market and under which such modifications would become unnecessary.

Do Not Jump Over Stages

In the use of the achievements of science and technology it is important to observe the succession of stages, more precisely the succession of separate stages: they created a scientific and technical potential—they used it completely—they simultaneously formed a new reserve, and so on. Here the principle of the maximality of the aggregate social and economic impact from the duplication and interchangeability of technological modes of social production should be implemented. The same principle also applies to the composition of the state order for scientific and technical progress.

Let us note that at present dangerous manifestations of the increased enthusiasm for superadvanced achievements of science, which will be ready for use no earlier than the end of the century, are possible. In our opinion, such trends became a reality after the active inclusion in planning of the category of priority directions of scientific and technical progress. The category, undoubtedly, is a necessary one, but what is one to understand by it?

It is necessary to face the truth and admit that the economy has been reduced to the state of the priority need for not long-range, but current management for the purpose of the rapid solution of the most urgent problems, without the elimination of which there is also no future. Consequently, it is necessary to narrow the planning horizon and to accomplish the concentration of resources. As applied to the centralized planning of scientific and technical progress this means the shortening of the interval of the anticipated return from the state order and the concentration of the assets being allocated for it on the priority scientific and technical directions, which ensure the most efficient solution of today's most important problems of socioeconomic development. These problems will be solved, the changeover to a new objective economic mechanism will be accomplished, and a balance of the reproduction of the national economy as an mandatory and the primary condition and at the same time the consequence of this changeover to a new economic system will be achieved—the broadening of the planning horizon will become necessary, the filling of the state order will also change accordingly.

Today one of the main tasks is resource conservation and (on its basis) ecology and, consequently, the expansion of the use of base resource-saving technologies. One should not look at them as something of yesterday. Within the framework of the available resources everything, which is the best among the alternative achievements of science and technology and yields the largest

socioeconomic impact among the nonalternative directions of the use of assets for scientific and technical progress in the sense of physical, material, and technological influence on the national economy, should be introduced.

The country should go through its own technological modes of production, which have already been gone through in many countries. The failure to introduce what is available today and the expectation of something better tomorrow, which is economically uncertain, complicate scientific and technical development. The jumping over of technological modes of production is not the rule, but an exception to it, since the effective use of supernew technologies often is held up by backward related spheres of production and the inadequate training of personnel. This reduces to naught the entire potential effectiveness of the most advanced achievements of science and technology.

The state order in the area of productive capital investments and the delivery of products for production purposes, including traditional products, which were assimilated earlier, should in the process of planning be examined initially primarily in interconnection with the state order for resource conservation by the expansion of the sphere of use of advanced based technologies and other achievements of science and technology. The scale of the possible, but unusable economic impact from their introduction is enormous. The following data, in particular, testify to this.

At present the losses of electric power during transmission over main electric power transmission lines in the USSR come to 8.9 percent, while in the United States in 1985 they came to 7.4 percent. This is explained by the lack of compensating devices. The degree of reactive power compensation in foreign countries is equal to 0.6-0.7 kilovar per kilowatt, while in our country it is equal to 0.3 kilovar per kilowatt. The increase of the degree of compensation to 0.5-0.6 kilovar per kilowatt will reduce the losses of electric power in networks by an amount that is equal to the annual output of electric power plants with a capacity of 6 million kilowatts, the building of which according to existing standards costs more than 1.2 billion rubles.

In USSR metallurgy the open hearth method, which does not ensure the necessary quality of the metal and does not make it possible to improve working conditions and to use efficiently the continuous casting of steel, which leads to the great overconsumption of materials, remains the dominant steel-making process. In 1987, 53 percent of all the steel was smelted by this method. At the same time Japan, the FRG, England, France, and Italy have shut open hearth works, while in the United States it accounts for only 4.1 percent. Continuous casting, which makes it possible to save 15-20 percent of the steel, power resources, and other materials and promotes the improvement of its quality, in the USSR came to about 16.1 percent, Japan—93 percent, the FRG—88 percent, France 93 percent, and the United States—58 percent.

The production of basic construction materials is distinguished by a high power-output ratio. Annually this sector consumes about 45 million tons of standard fuel and 30 billion kilowatt-hours of electric power. About 50 percent of all the fuel and power resources are used for the production of cement. In 1985, 221.6 kilograms of standard fuel were spent on the roasting of 1 ton of clinker, in 1990 it is envisaged to reduce its consumption to 210 kilograms. The introduction of the advanced technology of the "dry" method of the production of cement, which makes it possible to reduce fuel consumption to 165 kilograms per ton of clinker, is one of the fundamental solutions in the saving of fuel and power resources. However, the share of this product, which has been obtained by such a method, is being increased slowly by the USSR Ministry of the Construction Materials Industry. It is planned to increase the production of cement by this technology in 1990 to 22 percent of its total output, in 1987 it came to 16 percent, while in Japan it came to 78 percent and in the FRG it came to 90 percent (according to the data for 1987). The increase of the share of the production of clinker by 1 percent in its total production volume provides an additional saving of approximately 70,000 tons of standard fuel a year.

Practically all the listed base technologies directly influence the improvement of ecology. Ecology and resource conservation are inseparable.

The Structure of the State Order and the Increase of the Socioeconomic Orientation of Scientific and Technical Progress

If the state order, which has as the ultimate goal the creation of specific use values or the rendering of services, is reflected in the plan not with respect to scientific and technical development, this does not mean that on the part of scientific and technical progress it cannot be critically analyzed. In our opinion, the majority of assignments should have a breakdown of the state order on science and technology, which is internal for them, since it is inadmissible to spend state assets without the use of scientific and technical achievements. Consequently, the structure of the state order should be a matrix structure: "special-purpose state order"—"state order on scientific and technical progress for the most effective implementation of the special-purpose state order," for example, "to put into operation the capacity for the production of..."—"state order for the use of the corresponding advanced and resource-saving technologies"—"state order for the delivery of products for the introduction of technologies."

Scientific and technical progress is not an end in itself, but a means and condition of the effective achievement of specific social and economic results. The need for the inclusion of state orders on scientific and technical development in their general matrix structure, in which with respect to other types of assignments they should perform a support function, is also governed by this.

Only in this case can the state order on scientific and technical progress in reality be socially and economically oriented.

Under present conditions, when the solution of the problems of resource conservation and ecology have become top-priority, the socioeconomic goals of the state order and scientific and technical progress are closely linked. Consequently, the matrix structure with the distinction of the support section of scientific and technical progress can become an effective tool of not only the centralized planning of science and technology, but also the drafting of the state plan as a whole.

Based on the functions of centralized planning, the state order on scientific and technical progress should be formulated in several mutually intersecting sections and have in each of them a set of criteria of the optimality of the assignments that are included in the plan. One such section is the goal section, when a group of assignments, which are called upon in aggregate to accomplish one priority goal or another, is made a part of the state order. In the overwhelming majority the assignments should be components of state scientific and technical goal programs, for verified purposefulness is the basis of the state management of scientific and technical progress. It is possible to say with a high degree of certainty that if the program portion of the state order makes up less than 70 percent of its composition, the state planning of scientific and technical progress suffers from departmental disease, while the priority of national economic values is inadequately ensured. Therefore, the goal section of the state order is supplemented, on the one hand, by the program structure of the achievement of the set goals and, on the other, by the nonprogram part of the assignments.

Not only purposefulness is the starting point of the inclusion of one assignment or another in the plan. The great effectiveness of individual achievements of science and technology can become it.

The stages of the life cycle of scientific and technical developments (scientific research and experimental design work, approval, duplication), as well as the fundamental breakdown of joint assignments on scientific and technical progress and the other functional parts of the state order (the matrix principles of its formulation), including on the supply of the state order on science and technology (the delivery of products and the placement of facilities and capacities into operation), are other structural measurements of the state order.

With the changeover to the new economic mechanism the economic boundaries of the functions of the state planning of scientific and technical progress and the methods of their implementation are changing. The change of these boundaries should be equal to the innovations of the economic mechanism with the mandatory estimation of the degree to which the latter contribute to the acceleration of scientific and technical progress in case of the centralization of its management.

Now the problem of increasing the quality of the centralized planning of scientific and technical progress is becoming aggravated as never before. Its solution presumes: the development of a state system of the objective targeting of scientific and technical progress, first of all its social orientation; the formation of a mechanism of the economic regulation of the activity of the cost accounting unit in the direction of the achievement of the set goals on the basis of scientific and technical progress; the formulation of the state order, as a rule, on a goal program basis; the orientation of the applied portion of the state order on scientific and technical development toward its other components; the objective determination of the level of the centralization of assets; the real changeover to economic methods of the evaluation of the effectiveness of the assignments of the state order and the making of the corresponding planning decisions; the restructuring of the state system of scientific and technical information for the purpose of the information support of the development of the state planning of scientific and technical progress.

When drafting the plan for the 13th Five-Year Plan priority should be given to the social return of scientific and technical progress and to the most efficient resource conservation not only on the basis of the state order, but also by the economic stimulation of enterprises and the state budget support of the corresponding orientation of their activity.

Footnote

1. They have been removed from cost accounting, in fact from the point of view of the possible structure of the current consumption of resources, but have been integrated into cost accounting relations by centralized benefits and sanctions. For example, atomic energy in one form or another is state-subsidized in all developed countries.

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Role of Market in Accelerating S&T Progress

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[Article by RABOCHAYA TRIBUNA political commentator Yevgeniy Panov under the rubric "Notes of a Commentator": "Where the Spear of Progress Is To Fly"; first paragraph of each article is RABOCHAYA TRIBUNA introduction]

[14 Feb 90, p 2]

[Text] At the Second Congress of USSR People's Deputies, scientific and technical progress did not become a leading theme. N.I. Ryzhkov, when proposing the government program of the improvement of the economy, confined himself, in essence, to the statement of "the backward technical level of the production potential in

many sectors" and "the chronic lack of receptivity of the national economy to scientific and technical progress."

I. Deputy G. Filshin illustrated the thesis of backwardness. In Siberia, he said, only five percent of the equipment of the processing industry and three to four percent of the equipment of the mining industry conditionally conforms to the world level. While for the country as a whole it is possible by stretching the point to compare only a tenth of the developments with it.

Deputy I. Gorynin cited examples of the lack of receptivity. We have succeeded, he said, in making filters, which reduce the harmful exhaust of engines without platinum additions, at the cost of 100 rubles each, while abroad they cost \$200-250. Having used them just on motor vehicles that are produced in the country, it would be possible to clean the air of cities, to save 20 tons of platinum, and to save more than 1.5 billion rubles a year. But there both was no and is no client for the filters. And, to all appearances, in the next few years there will not be one. Because, the academician summed up, the government has not presented a clear picture of the development of scientific and technical progress during the 13th Five-Year Plan. Academicians Zh. Alferov and B. Paton agreed with this conclusion.

The summary of the Congress: We seriously lag behind not only the leading capitalist states, but also many socialist states. And this, as Deputy R. Khabibullin noted, "is placing in doubt the viability of our system. To remain in such a state means to lose every year, every month, and every day the values of socialism."

It is possible, I believe, to survive the ideological losses. It is worse that given the chronic technological feebleness actually every year, every month, and every day truly irreplaceable values are being lost: the physical and spiritual health of the people, the nature of the native land, and the age-old culture. It is worse that it is impossible to live in houses fit for living, to eat clean food, to dress comfortably, to travel wherever the heart desires, and to vacation wherever one fancies. It is worse that plants and railroads are falling into decay, cities are declining.... But we will still have time to talk about the ideologization of scientific and technical progress. Now let us return to the verbatim report of the Congress and get a grasp of a few constructive proposals of the deputies.

At the heart they coincide: The receptivity of the national economy to innovations will appear only in case of economic methods of the management of scientific and technical progress. On other words, the acceleration of scientific and technical progress is directly connected with the improvement of the economy, technological progress is inalienable from economic reform. The goal of reform, as is known, is the transition to an efficient economy, that is, to a modern socialist market. Hence, only market regulators can be genuine regulators of progress. The experience of the developed countries,

where no one is worried about the acceleration of scientific and technical progress, proves this. Innovations are integrally assimilated by industry and become a part of the flesh of production. The innovation environment is a natural part of the economy....

What is one to remark here? The conclusions are the only correct ones, but ones that have been well known for a long time. Here the Congress did not advance and could not have advanced a single step. Because all the words have been said, because it is a matter of a choice: to recognize either the laws of an economy, which is free of the ideological and political situation, or the dogmas of the political economy of socialism. Alas, the deputies this time also chewed the political economic cud to their heart's content. It is not surprising: The generations, which, being the most unbridled, irreconcilable materialists, built the most idealistic economic system in the world, were raised on it. This was also spoken about at the Congress.

Thus, it is obvious that without market catalysts scientific and technical progress will not become embedded in the fabric of the economy. But it is also clear that, by rejecting innovations, the economy will not proceed to a modern market, for the modern market is first of all a market of science-intensive products. So how is one to understand scientific and technical progress—as a goal of the operation of the market or as a means of its establishment? The formula "the goal is the utmost acceleration of scientific and technical progress" is a commonplace of tens of official documents. The formula "the goal is the acceleration of the socioeconomic development of the country on the basis of the achievements of scientific and technical progress" is just as much a commonplace. As what does technological progress act here: as a goal or as a means? It is unclear.... The confusion stems from the habit of thoughtless slogan wordings. In reality scientific and technical progress is not a final goal and not a bare means—it is simultaneously both a means and a goal, the dialectical unity of both, as, incidentally, all human culture is.

Being an integral element of culture, of "second nature," scientific and technical progress forms its "iron," mechanical, industrial part. On this level it is also ambiguous. Industry, which consumes the natural resources of the planet and contaminates it with waste products, is a condition of the existence, the very survival of man and at the same time his curse. The curse of Chernobyl. The curse of the Aral Sea. The price of progress at times is inordinately high, and the confidence in science and technology is falling sharply. At numerous and crowded meetings they are demanding the prohibition of nuclear energy.

Academician B. Raushenbakh generalized the main objections of the opponents of scientific and technical progress. They are roughly the following. Scientific and technical progress is leading to the destruction of the planet's environment, and the earth will soon be unfit for

life. It is turning medicine into its opposite, since chemical drugs, while curing some illnesses, are giving rise to others, which it is becoming more and more difficult to treat. Progress is leading to the deformation of the human soul itself—the standardization of life, the leveling of the personality are increasing.... "The danger hanging over people has now become so formidable and real," the academician writes, "that at times a different, unconstructive feeling—panic fear, which sometimes develops into the thoughtless denial of the progressive nature of progress itself—takes the place of reasonable caution."

All this, of course, is more than serious, but has also been familiar for a long time. It was Marx who wrote that science does not exist in the consciousness of the worker, but influences him as a force alien to him, that not the worker controls the movement of machines, but, on the contrary, his activity is governed and regulated by machines. The triumph of soulless mechanisms could not but evoke hatreds. The Luddites smashed machine tools. Two centuries have passed since their rebellions. Today a computer controls machine tools. A machine has freed the worker from servile subordination to a machine. It is necessary to understand absolutely clearly—technological progress is unstoppable. For it, I will repeat, is a part of culture, of "second nature," which the first need and, in essence, the only job of man are to create.

Luddite sentiments are erroneous and transient, but—and it is also necessary to take this into account—are by no means unnatural. At critical moments of development culture or its elements can be perceived as a curse (Chernobyl, the Aral Sea!) and cause the reaction of destruction.

The capitalist industrial revolution of the late 18th century was a critical moment. Today our country is also going through a crisis. We are groping for a new path. Scientific and technical progress should also take some new, different path. In itself it is neutral, it, to use the expression of B. Raushenbakh, much like the fairytale Tyan-Tolky, is prepared to go in both directions. The choice of the direction is the job of the horseman.

When getting into the saddle, it is useful to know about the ravines and potholes on the road. I will talk about them in the next article.

[15 Feb 90, p 2]

[Text] In June of last year the traveling exhibitions "Soviet Science and Technology," which were organized by the USSR State Committee for Science and Technology, were held in the FRG and Italy. Completed scientific research and design works in the field of machine building, new materials, medicine and pharmacology, biotechnology, instrument making, electronics, and electrical engineering were displayed at them.

II. The new concept of international scientific and technical cooperation, which has been adopted by the USSR

State Committee for Science and Technology, involves the introduction on the foreign market of domestic ideas, which cannot be introduced in our country on our own, but are undoubtedly promising for joint assimilation with foreign partners. To put it briefly, our "brains" are foreign money. It is important for us, of course, to sell "brains" at a little higher price. An effective means of bringing ideas to the intellectual market is needed. Exhibitions are one such means.

In the FRG and Italy the exhibitions produced, in the words of staff members of the State Committee for Science and Technology, an insane effect. Newspapers wrote: "For the first time the technologies of Gorbachev are traveling to the West," "For the first time the Soviets are not buying, but are selling know-how...." Protocols of intentions were signed with respect to 173 of the 400 developments displayed at the exhibitions. An understanding on the establishment of five joint ventures was reached. A total of 12 cooperative contracts were signed. In all 28 of 110 new technologies were sold.

We always have joyous reporting figures, I said to the personnel of the State Committee for Science and Technology. They are being achieved in a professional manner. Even such a profession exists—to paint a bright future. It is these professionals who are traveling through the Apennines and along the banks of the Rhine. While I, let us assume, am a director somewhere...well, in Morshansk. And in my basement two Kulibins were mysteriously busy for a year with some gadget. And I left them alone. And after a year they come and say: We have surpassed everyone, the firm people do not have and cannot have anything similar, find out the address of the world market!

Exactly, the fellows at the State Committee for Science and Technology agreed. Generators of ideas, Kulibins and Cherepanovs, dwell mainly in basements, not at head scientific research institutes and design bureaus. Half of them have been snubbed and offended by science dignitaries and orthodox experts. This half can leave for abroad, although, as a rule, they do not want to leave. They will abduct them. They will promise them the opportunity to work, but Kulibins do not need anything more, and will abduct them.... Precisely exhibitions are also helping to combat the "brain" drain. Not dignitaries, not experts, not any intermediary representatives, but the very directors of enterprises and the very authors of ideas took the exhibits to the FRG and Italy. And again it was not bureaucrats who picked the developments, the representatives of German and Italian firms picked them without preliminary Soviet evaluation.

The commercial aspect of the matter for our Kulibins proved to be far more complex than the technical aspect. For all the unquestionable overall success of the exhibitions there were also failures there. Moreover, very unexpected and regrettable ones.

Tell me, would a revolutionary technology, which yields a fivefold increase of labor productivity, interest you?

Your eyes will most likely light up. But for some reason the eyes of firm people did not light up. They do not need, it turns out, a fivefold increase. In the future, perhaps, it will be needed, but now it is not, it is not needed. Because a revolutionary change in production will face the firm with social problems, which are difficult to solve and, in addition, will begin to disperse like rings on water.

Western entrepreneurs are quite often left indifferent by what makes our, Soviet, flesh creep. The "superlative" (productive, high-speed, reliable, large, and so on) is of little interest to them. As they see it, scientific and technical progress should yield the specific fruits which the consumer needs today. And inasmuch as the "superlative" at this moment is not of interest to the average statistical, mass, impersonal consumer, it also does not interest the producer.

What was and, to all appearances, will be in the immediate future in demand among potential western partners? Where is the West willing to invest money? In basic research on man, in medicine—new drugs, equipment, instruments, diagnostic aids. In the production of chemically and biologically pure foods. In ecology, that is, in "clean" production processes based on biotechnologies.

The results of the exhibitions are a good reason to think about a new means of developing scientific and technical progress. First, the following conclusion suggests itself: When striving for commercial success on the international market, completely forget the dogmas of the political economy of socialism and get out of your head the idea that scientific and technical progress is the key to the competition of the two systems.

Perhaps, there is no more prevalent and persistent a stereotype than this one. Either we will get astride the technological revolution or other states will begin to drive us back, but this is absolutely impossible when it is a question of the might of the country and its international influence—that is what one publicist, who is well known and whom I respect, wrote already during "the era of new thinking." He cautioned: the competition—economic, military, cultural information—between different socioeconomic systems takes place both in the most fierce form and in the most rapid rhythm. And, in order to win this competition, it is necessary to advance quickly, very quickly.

When people worry in this way about the might of the state, it is awkward to argue. But, first, technological progress is based on objective scientific knowledge, which is breaking with ideology, because in principle it does not correspond with anyone's subjective notions and desires "to increase," "to raise," "to accelerate." And, second, the ideologization of scientific and technical progress has led to many troubles. For the "superlative" (productive, powerful, extended) was usually created with a single real goal—to prove the advantages of socialism. Stalin's industrial construction of "giants" was particularly inhuman. And "the construction

projects of the century" of the era of stagnation were no more humane, except that not slave-prisoners, but "all-weather" enthusiasts built them. The "superlative" serves not the needs of people, but the vanities of politicians, who in a calculating manner exploit the misconceptions of mass consciousness. When defending the purity of the system, they show off without fail the outstanding achievements of Soviet science and technology—the Energija-Buran space system or the Mriya airplane. Of course, the ideological lifting capacity of these machines is outstanding. That is why the "quiet" technologies, which interested firm people (and in their person unspoiled western consumers) at the exhibitions in the FRG and Italy, seem to me, for example, to be more serious achievements.

The ideological brakes of technological progress so far have not been released. And it is a matter not only of the mercenary spirit of some people and the honest ignorance of others. For the owner-entrepreneur scientific and technical progress is a weapon in the competitive struggle. In our country the state is the strongest owner. It also supervises competition—foreign policy competition.

Who manages progress in economies of the market type? The consumer. How? By subsidizing development with his own money. By investing savings in the stock of a firm, he, of course, is taking a risk, for the firm might fail. That, incidentally, also happens fairly often. The experience of the United States shows that in the end a tenth of the innovations reach the market. In our country the bureaucrat manages progress and divides budget assets. He is looking after the interests of the state. I am saying this without the slightest irony—the bureaucrat, by watching the people's kopeck, is performing his immediate duties. The two Kulibins from the basement force their way through to a reception with him and promise something fantastic. The bureaucrat, perhaps, would risk his own ruble, but not the common ruble, he cannot at once. He temporizes and weighs. In the end caution gains the upper hand. They turn down the Kulibins. Well-known foreign equipment is taken as a reference point. True, it was put on the market about 10 years ago. In another 10 years a specially built plant begins to produce domestic machines, which are hopelessly obsolete and are obviously worse than the analogs. Being 20 years late, Deputy Chairman of the USSR Council of Ministers I. Silayev admitted in one of his interviews, is customary for us.

And what about our consumer? Under the conditions of the total monopolism of the producer and a total deficit he gobble up what they give and says "thank you." He is deprived of the natural right to vote with the ruble. The USSR Council of Ministers has approved 14 state scientific and technical programs, which reflect the priorities of Soviet science and technology for the next few years. Without disputing the importance of priorities and the soundness of the programs, I am afraid that the majority of consumers of the products of scientific and technical progress have an extremely vague idea about

them. I am afraid that the consumer in practice will not be able to influence their fulfillment. I am afraid that he is simply not interested in them. But the programs require enormous capital investments—from there, from the state budget. Performers are fighting for them. Hence, precisely they, not consumers, personify the social need. Hence, head scientific research institutes are becoming monopolists, are preserving their own level, and are accumulating and reproducing backwardness. Is it an absurdity? Of course.

The present system of the state management of technological progress is leading to a dead end—that is our second conclusion. The bankruptcy of economies of the administrative type in the sphere of scientific and technical progress is unquestionable. A radically different system is required. For example, the following one.

At the first stage, strictly speaking, there is no management. Chaos and free searching dominate here. The broader the freedom for it is, the greater the probability of a breakthrough is. Mobile organizations with risk capital—venture firms, scientific and technical centers, temporary creative collectives, engineering cooperatives...—operate here.

And here a breakthrough has been made. It is here, at the second stage, that the state joins in, replenishes the work with finances, and provides organizational support. With all its might the state strives to develop success.

Where is it possible today? I will talk about this in the next article.

[16 Feb 90, p 2]

[Text] By progress there is usually understood a vertical ascent. Steam locomotive—diesel locomotive—electric locomotive.... An obvious chain, in which the next machine has not simply a more advanced, but also a qualitatively different engine, an engine of a different scientific and technical level. However, it is also possible to approach perfection vertically. Today it is possible to make the same electric locomotive better than yesterday, and tomorrow, better than today.

III. Horizontal progress combines splendidly with a market economy. Its main principle is to make a living with what you know how to make better than others. Our industry knows how to make something better than many, if not everyone, in the world. For example, space and military hardware. Therefore, to convert defense plants, which have unique technologies, to the production of juice extractors is a regular economic folly. These technologies ought to be exported. But arguments about economic expediency and ordinary arguments of reason for the present are powerless here, and I lapse into silence.

Now let us look at the prospects of vertical progress. However strange, the chaos of the initial free search, a necessary condition of movement vertically, already exists in our country. It is strange because it originated in

the depths of the severely overcentralized planned economy. On the other hand, there is nothing strange. Receiving a guaranteed wage, the associates of various scientific research institutes and design bureaus fulfilled the boring plans fair to middling, while if they were not cunning, they loafed. True, whoever was unable not to work (Kulibins and Cherepanovs) worked, though not for the plan, but for their pleasure. The satisfaction of one's own curiosity at public expense turned into a benefit for the state. Rather, it could have. Approximately 70,000 author's certificates for inventions are issued annually in the USSR. Even though a third of them are the free play of the undisciplined mind, which is useless for practice, and even though a third modify the whistle for a teapot, all the same the remaining third are enormous intellectual wealth.

The fate of inventions in our homeland is sad, in 95 out of 100 cases they remain unclaimed. As we have seen, the western consumer market is beginning to assimilate crumbs from this gold reserve. I ask you to note: consumer. This is the market of a consumer society. For a long time we spoke about it precisely disdainfully. Bourgeois satiation, narrow-minded limitedness, consumerism, standardization, the lack of spirituality—and you have no ideals, no aspiration for a bright future. Meanwhile, if you look not through gray ideological glasses, this is simply a society that is aimed at meeting the needs of man. Entrepreneurship is automatically aimed at this. We sigh on seeing some nonsensical things, some trifling things for the kitchen, which have been imported "from there." First of all they are delightfully convenient. It is no wonder: Design thought, the findings of industrial designers, the advice of psychologists, the calculations of specialists in ergonomics, and the labor of self-respecting workers, who are incapable of doing careless work even at gun point, are incorporated in them.

We will not, however, forget that a consumer society is founded on competition. So that production would yield a profit, it is necessary to seek needs that have not yet been met or to kindle them artificially, by throwing on the market newer and newer types of motor vehicles or products. This leads to the high consumption of more and more expensive raw materials and power, the costs eat up the profit. Then the entrepreneur increases the science-intensiveness of items. But resource-saving automated technologies make it possible to manage with a smaller number of personnel, therefore, new workplaces have to be created, production has to be expanded.... It seems like the endless twisting of a spiral, but it only seems like it. A limit, if only an ecological one, exists here. Beyond it are the irreversible spoiling of nature and the death of people.

Of course, in the West they understand this. Today it is simply difficult for a conscientious person to idolize metal and the Brooklyn Bridge, and whereas my spiritual fathers went from man to machine, I on another turn of the spiral am going back—this is the thought of the great present-day artist Ernst Neizvestny. The departure

from man to machine, he believes, was realized historically. Is not this return behind our commercial successes at the exhibitions in the FRG and Italy? Does not the new strategy of scientific and technical progress show through here? The West is willing to invest money in medicine, in ecology—in everything that leads away from machine and leads to man.

Yes, these are the concerns of the rich, who have coped with the most diverse, but all the same obvious needs and because of that allow themselves to behave capriciously. Give them, do you see, not simply steak, but ecologically clean steak. The concerns of the poor are a bit more simple. If we could eat our fill, clothe ourselves, and get better. On our clock it is a different time.

True, the hands of all the clocks on earth turn in the same direction. Sooner or later these problems will also face us. Rather, they are already facing us. From a technological point of view our country is in the past, but the spiritual quest, practical experience, and the threatening rebellion of nature dictate the necessity of rejecting the deification of industry and returning to man.

Do we have the economic base for switching scientific and technical progress to a new path? Let us admit honestly: no. And it might very well be that it is impossible to create it without having passed through all the stages of economic growth, through which the developed countries have passed, including the stage of a consumer society. I want to reassure those who as before see in it a hostile symbol: Do not be frightened, it will not appear tomorrow, oh, how far it is to it. Meanwhile we are passing, conditionally speaking, through the period of the initial accumulation of capital. The pitiful number of joint ventures and the handful of Soviet entrepreneurs, who are working in the European fashion, do not affect the matter. Meanwhile the state sector is switching to barter, economic romanticism or else undisguised gangsterism reigns among the newly appeared businessmen. The state is plundering, robbing cooperative members. Cooperative members are plundering, robbing the state. Professional honesty and business decency are extremely rare.

I agree with those who reduce the problem of progress to the problem of the worker. No matter how much you keep saying about the cultivation of the sense of being the master, it is cultivated only by life itself, by the normal course of economic development. In order to turn into the master, a person should be boiled thoroughly in the market kettle. The path to the modern socialist market, we have already spoken about this, lies through the establishment of science-intensive works. And then according to the scheme, which is characteristic of all industrial societies: Partial unemployment, the placement of new works into operation, fantastic loads on nature, but it is on the verge of catastrophe as it is.

And for that reason it may very well be that the western model all the same is not for us. The moment has been let

pass. The development of the economy restricts the quality of personnel and the possibilities of the natural environment. No matter how one would like to have everything that "they" have, one will have to judiciously restrict needs. One will constantly have to choose: This is vitally necessary, it is possible to manage without this. Hence, the exacting selection of the key directions of scientific and technical progress and the specification of its real priorities will also be needed.

I believe that the life sciences should become truly priority. There are serious reasons to believe that life is something completely different than what people have become accustomed to think. That fantastic possibilities are concealed in man. That the resources of the body and its protective powers are phenomenal. If only nontraditional medicine, which without drugs and the scalpel heals where traditional medicine is powerless, proves this.

Among the 14 state scientific and technical programs, which have been formulated by the USSR State Committee for Science and Technology, there is the Human Genome Program. Its goal is to understand how our body lives, develops, and ages and why it becomes ill and to find effective, faultless methods of prevention, diagnosis, and treatment.

The task is a noble one. Just one thing in it disturbs me—its clear technocratic taste. The mechanistic approach. It divides the world, dissects it like a corpse, and studies it by pieces. Today it is capable of mobilizing for the "disassembly" of man the enormous potential of civilization, of scattering into little screws and gears, lubricating, correcting, replacing defective parts, and reassembling.

Recently they replaced simultaneously the heart, liver, and kidneys of a young American woman with artificial ones. Our medicine is not yet capable of such miracles. In the United States they are also decoding the genome and will probably do this more quickly—the pace of the work is governed by the number and quality of computers, and here we are about 15 years behind. There is nothing, it would seem, to rejoice over. But.... In backwardness, however paradoxical, there are also its advantages. Poverty may do us a good favor. To find our own path.

Technology, clearly, emerged as compensation for the physical weakness, the natural lack of adaptation of man. Then it became a self-sufficient system. Then it gave rise to a machine for the dissection of man (the tomograph) and his adjustment to the environment (the artificial heart). Tomorrow it is preparing to develop a machine for his genetic improvement. This is the western version. Here at the end of the chain, in spite of the need to return, is a machine, not man. Man all the same is an object of influence. Man "outside technologies," "man-not-mechanism"—a self-valuable, self-sufficient, thus far not known biological being, who has unique abilities

and reserves and has been inseparably incorporated in the cosmic wholeness—is capable of becoming the final link in our version.

A detailed discussion of this is ahead, if, of course, the readers keep it up. Perhaps, my quite cursory notes will seem to them debatable or fundamentally incorrect. Yes, I am not laying claim to the truth in either the last or even the next to last instance. In such a matter as the choice of the strategy and tactics of scientific and technical progress the truth is too complicated. Let us think and argue. The country will at any moment begin to rise from the pit of crisis. Where will it go?

Rejuvenation of People's Universities Advocated

907A0140A Moscow ARGUMENTY I FAKTY
in Russian No 7, 17-23 Feb 90 pp 4-5

[Report by L. Novikova on round-table meeting of the All-Union Society for Knowledge under the rubric "The Round Table of the Society for Knowledge": "A Market of Knowledge Is Needed"; date and place not given; first paragraph is ARGUMENTY I FAKTY introduction; last paragraph is ARGUMENTY I FAKTY conclusion]

[Text] The processes of restructuring are very dynamic and flexible and need first of all manpower support, in which great professionalism is necessary. The traditional system of education, unfortunately, is very sluggish. Is it worthwhile to reinvent the bicycle? Should we, perhaps, return to, alas, the long-forgotten old—to the people's universities—and "resuscitate" them? This question was the theme of a round table that was held in the All-Union Society for Knowledge. Its participants: Doctor of Philosophical Sciences V.K. Arsenkin, scientific secretary of the Central Council of People's Universities; G.B. Bobosadykova, deputy chairman of the Board of the All-Union Society for Knowledge; Doctor of Economic Sciences I.F. Baydyuk, professor of the Moscow Aviation Institute imeni Sergo Ordzhonikidze; Doctor of Pedagogical Sciences B.S. Gershunskiy, head of a laboratory of the USSR Academy of Pedagogical Sciences; A.S. Kapto, chief of the Ideology Department of the CPSU Central Committee; Candidate of Juridical Sciences M.D. Matiyevskiy, rector of a people's university from Krasnodar; Candidate of Technical Sciences V.M. Romanov, rector of a people's university from Sverdlovsk; D.B. Fingaret, prorector of a people's university from Moscow; and G.Kh. Rotberg, head of a department of the Institute of Physics of the Latvian SSR Academy of Sciences, shared their thoughts on this question.

B. S. Gershunskiy: We cannot wait until we obtain a new generation of professionally trained people, who could actively take part and flexibly change their approach in the socioeconomic structure, which is also changing rapidly. Throughout the world this is realized, this is also realized in our country. The latest speech of M.S. Gorbachev at the CPSU Central Committee Plenum clearly indicates the priorities of the educational sphere. But,

unfortunately, precisely informal adult education in our country is very poorly developed.

But the Society for Knowledge has quite a number of people's universities, at which much experience has been gained. If we rely on it, having, of course, increased the quality of the work of people's universities, meaning the material and technical base and the staff of lecturers, this will perhaps be the link, after catching hold of which it will be possible to start pulling out the entire network of informal adult education.

A. S. Kapto: In speaking about spirituality and morality, we have also lost very much in this direction. See how interesting the genesis of this phenomenon is. The source of the people's universities is Sunday schools, Gertsen, Belinskiy, Chernyshevskiy, and Dobrolyubov were at the source of this movement. Several of them began to be called people's workers' universities, and these actually were schools for the people.

This experience was consolidated during the first years after the revolution by the establishment of workers' faculties and then an extensive network of diverse formations, which made it possible to reach the broadest audiences.

On the conceptual level, it seems to me that, on the one hand, we should take the path of improving the existing system of people's universities, having discarded everything ostentatious. On the other hand, there is an entire system of new forms of informal adult education, these are express universities, vacation schools, consultation centers, courses and schools of managers, courses for the study of foreign languages, and so on.

D. B. Fingaret: The system of people's universities in the country was in a state of crisis. Many thousands of pseudo-people's universities, which were registered in accordance with statistics in organizations of the Society for Knowledge, trade unions, scientific and technical societies, ministries, and departments, and millions of their students in reality existed only on paper.

The Central Council of People's Universities, which has existed since 1968, could help in correcting the formed situation, which obviously does not conform to the interests of perestroika. But it seems that at present it is in a state of passivity and confusion. It seems to us that the establishment of an association of people's universities is the best version of the decisive improvement of the state of affairs with people's universities, their freeing of all kinds of negative accretions, and their attraction to active participation in the system of continuous education, which is being formed.

G. Kh. Rotberg: The People's University of Latvia has a historic past. The fact that the Riga People's Higher Educational Institute was formed by left-wing parties in the 1920's, was suppressed for long years. Now we can judge from obituaries that many people, who are well known in our country, at that time were either graduates of this university or its instructors.

And now in our country along with the practice of people's universities the system of adult education on urgent problems of the day: The market economy, the historical legacy, has undergone rapid development. The republic society of jurists is carrying out widely the advanced training of specialists. Competition is already being observed on the market of new knowledge.

Now knowledge costs money. For example, these days there is being conducted in Riga a seminar, which was organized by the republic club of managers, while a businessman from Sweden, who is teaching the Latvian audience how it is necessary to export goods for the broad Swedish market, is acting as the instructor. I do not want to say that this is our character, but if the system of people's universities does not enter the ranks of the associations, which have already won the market of knowledge, we must either carry out complete dismantling or declare that we have receded into history. We are now supporting the new corps of deputies. Either they will have confidence in our pedagogical services or they will not. There is also a special issue—the material status, the technical supply of the system of people's universities. We have been self-financing for a long time, although there were the corresponding decrees of the Latvian CP Central Committee, in which ministries and departments were ordered to give us assistance in financing and so forth. But why do we not have legal rights?

G. B. Bobosadykova: The isolated subjective opinions that the Society for Knowledge is now outside the people's universities are incorrect. Yes, there were the opinions that the Society for Knowledge should be concerned only with people's universities of the sociopolitical type and people's universities of lecturing skill.

In connection with this the department of people's universities attached to the Board of the Society for Knowledge was eliminated. Besides this, the reduction of the staffs of the Society for Knowledge took place precisely at the expense of the personnel of these departments.

The Society for Knowledge is the organization, which today could lead and unite the people's universities under its banner. Perhaps, we need a council for adult education, or somehow to call it something else, but the public form of education, the promotion of knowledge, and the state system of adult education would be united in it. This is also continuous education, which we now so need.

I. F. Baydyuk: Previously the universities actually were a spiritual bearer of knowledge, because they were headed by our best scientists. While still a boy I went to the Polytechnical Museum for lectures, in order to become acquainted, to broaden my knowledge, and to improve my profession.

Let us take today. If an engineer uses from the obtained metal only 30 percent of the components, what kind of engineer is he? What kind of engineer is he, if he

increases the weight of an agricultural machine by two-fold or threefold and 30 to 40 percent of the crop is lost? This is where economics begins! In our country the meeting points of different fields of knowledge are disconnected! Therefore, undoubtedly, the universities should exist. And it is necessary to trust them to scientists and science.

V. K. Arsenkin: Approximately 12 percent of the universities have been operating more than 20 years, 40 percent have been operating more than 10 years, and 30 percent have been operating more than five years (of the total number of universities in our country). In my opinion, the question not of whether or not the universities are to exist, but of what they are to be like, is being settled. I will cite in this connection the following disturbing facts. Whereas in the 1950's our country in the coefficient of the intellectualization of young people was in 3d place in the world, in 1985 we were in 47th place, while by 1987 we were in 57th place. According to the data of the USSR State Committee for Statistics, until recently from six to 10 minutes a day were spent by working males on education, training, and the improvement of skills and four minutes a day on the average were spent by kolkhoz farmers. These realities of present-day life cannot but be taken into account.

M. D. Matiyevskiy: For the people's university of Krasnodar Kray such words are stagnation and dead end are inapplicable in general. The university has existed for 30 years. If we had the proper material and technical base, we would have today not just 2,500 students, but twofold more.

We have more than 20 faculties. It is possible to learn any language—Chinese, Japanese. Students are studying the culture and languages of the peoples of the USSR.

However, the university is located in basement premises. We lease a building at the university, at the law faculty, where I work, at the Kuban University, at higher educational institutions, and at schools. This is what is hampering us today, and not the organizational questions that are being discussed here.

As for the goals and tasks of the people's universities, by analyzing the experience of work, I believe that we should not seize the initiative from state educational institutions, the people's universities should have different goals and tasks. One must not turn the people's university into a cooperative that trades in knowledge. But how is one to survive? How is one to attach well-trained personnel? This is a very complex question, for good work should be well-paid.

V. M. Romanov: I represent of one of the six universities that operate within the Ural Polytechnical Institute. Being personnel of the radio engineering faculty, we have observed how the gap between the demands, which are made on the specialists whom the higher educational institution trains, and their actual level increases year after year. This is a consequence of the conservatism of our higher school. Our basic task is the elimination of

this existing gap. The university enjoys enormous popularity, because we continuously follow the most promising directions, in which instruction should be conducted, and increase the skills of specialists.

I will cite an example. At our university one of the directions is microprocessor engineering. We began to train specialists in this specialty in 1976, while in the curricula of higher educational institutions this discipline began to appear only 10 years later.

There are very many people who want to enroll here. But one must not provide such knowledge only on paper. We need equipment and a material base.

A. S. Kapto: During our discussion it is coming to light that, in reality, we do not even know our rights. We are now on the eve of the passage of the Law on Public Organizations. The corresponding sections, which concern the Society for Knowledge, are present there. I took part in the preparation of the draft of this law. In this case I am driving at the fact that the passage of this law will afford opportunities to settle the legal aspects, because we will to manage without a legislative basis and without the designation of the legal framework.

B. S. Gershunskiy: I believe that the quality of the work of the people's universities is all the same the decisive issue.

There is also another function that rests on the Society for Knowledge—we cannot passively study needs. We should actively form them.

A. S. Kapto: Today a number of interesting problems were touched upon in the discussion. These are the quality of the educational process, these are structural questions, without which we cannot advance a single step.

Therefore, it seems to me, it would be a good idea to address the set of these questions to the readers and the active members of the Society for Knowledge and to involve them in the discussion. I am certain that new problems and new questions will turn up. Then we could gather again in order to attain the submission of some basic provisions—for the leadership of the Society for Knowledge and, if necessary, for the government and for public organizations. But the fact that this is a humanistic cause, a great-sounding cause—we should protect and advance further—personally I do not have any doubts about this.

The round-table participants and the editorial board hope that you, dear readers, will continue this discussion. We await your suggestions.

Performance of Kazakh Academy of Sciences Studied

907A0158A Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 15 Feb 90 p 3

[Article by L. Vaydman and Ye. Smailov: "The Academy. A Study of Morals"; passages in boldface as published]

[Text] "Pardon me," he very intelligently stated, rather than asked. It had long ago become clear to him, over his long life, that journalists are as much equal among academicians, as academicians among journalists. "What will we talk about? After all, science is to a certain extent specific."

However, a different subject of conversation had been planned, aside from the hidden secrets of knowledge, where nobody except the specially initiated understands anything: What do the almost 40 million rubles that make up the republic Academy of Sciences' annual budget give to society?

Answers to the endless questions had to be sought in entirely different areas, far removed from science.

Even in times long past.

The Second Academician and Sixth President

That at which we have arrived today is not a shortage of soap, but the near absolute social apathy of the individual, who has become indifferent to society's problems.

This all began in the starry hours of the time of social stagnation, which lasted for 18 dark years and another troubled three years.

Today, signs of nervous impatience and obvious skepticism are being displayed in society ever more often with regard to the new political course of the country's leadership. However, even in five years, it is hardly possible to get out of the situation in which the country has found itself. The reason here is not the petrodollars that the treasury lost as a result of the energetically changing world market, and not the mistakes in the approach to waging the anti-alcohol campaign, in which money was nonetheless squandered on drink, but did not go into the state budget.

The causes lies in the spiritual and moral impoverishment of society, which took shape under the conditions of the period of stagnation.

These are not abstract maxims, not stones thrown at the back of the past.

Moral decay did not begin suddenly, but first affected the vitally important centers of society, which turned out to include the Academy also, the concept of which evokes unconditional respect. The more so, since in certain stages of its 44-year history it has managed to do a great deal both for the development of production

forces in the republic, as well as for its spiritual culture. With full grounds, we can include the presidencies of K. Satpayev, D. Kunayev, Sh. Chokin, and Sh. Yesenov in those periods.

However, the first decade of the System that finally took shape, in which even the impossible became possible, has already ended.

March 1974 arrived and the president, just unanimously elected for his second term, wrote a petition for his voluntary retirement in the reception room of Valentin Karpovich Mesyats, Communist Party Central Committee second secretary.

There Was Still Nothing Secret, That Would Not Have Become Obvious...

Today, that distant episode has become part of the very rich folklore, that took shape in the years of stagnation, in which it was no longer possible to separate reality from fantasy. That is why oral folk tradition cannot be used as historical fact. However, in its own way it illustrates public opinion of the time.

In the course of 16 years, the legend was repeated of a very intimate conversation between the First and General secretaries, as though someone might have been present, regarding the early removal of President Yesenov and innumerable letters to the government requesting the appointment of Academician Askar Minliakhmedovich Kunayev to the republic's highest "scientific post," as the only one worthy. As an incontrovertible argument, they mention one of Leonid Ilich's remarks, that any man be a communist above all, and then be anything you wish...

However, there are facts, and there is the logic of fact.

Kazakh science has had many brilliant scientists, including Lenin and State prize winners and names known throughout the world. However, nonetheless, only two people became active members of the USSR Academy of Sciences: Kanysh Imantayevich Satpayev and Askar Minliakhmedovich Kunayev.

This is no longer the realm of folklore. This is a historically verified fact, just like the fact that a special vacancy was made for the Kazakh then already president by the one-man power of the CPSU Central Committee General Secretary (an unprecedented event in the USSR Academy of Sciences, which had always been proud of the constancy of its traditions and independent in its decisions). A tsar could scarcely have done such, even in Peter's day. Yet, this was not especially difficult for Leonid Ilich, nor was the shameful reprisal against one of the most outstanding scientists and humanists of our time.

So, if one wished, everything really was possible.

Incidentally, Dmitriy Ivanovich Mendeleyev, whose works have taught chemistry to many generations, and who has been recognized by world science, attempted

four times to become an active member of the USSR Academy, but failed. Yet, the General Secretary's protege joined it without any difficulties. That is why one's family name began to play an incomparably greater role in science, than one's first name.

However, why this unpleasant excursion into matters of the not-so-distant past? This is only in order to understand the nature of that which happened.

The 12 years of stagnant presidency not only determined the state of academic science in the republic, but also shaped its morals.

It is not morality that is a social category, but morals.

Uphill With The Brakes On

Here are several excerpts from very authoritative documents, which give a fairly accurate assessment of the republic Academy:

The share and level of basic research and the quality of original development work have declined, and there have been no scientific discoveries.

No licenses have been sold, and 45 percent of the claims made are not deemed inventions.

The level of President A.M. Kunayev's leadership of the KaSSR Academy of Sciences is low. The role of the presidium, the bureau, and the department general meetings has declined.

The effectiveness of training scientific cadres by way of graduate study is poor.

The level of coordination of work is low. The Academy of Sciences has not influenced the acceleration of scientific and technical progress or the development of the republic's production forces.

There is a lag in the technologies for developing useful mineral deposits, as well as land use, fodder production, nuclear physics, solid state physics and electronics.

Steps have not been taken to create design bureaus, and the experimental base that has been created is not used in practice.

The allocated funds are not giving the proper yield in the institutes for metallurgy and enrichment, nuclear physics, experimental biology, and soil sciences.

There is a great deal of very expensive unused equipment in the academy.

Vice-president S.M. Kozhakhmetov has not ensured proper control over the course of application, and has reconciled himself to white-washing and figure-padding of the economic effects.

Negative phenomena exist in cadre policy: protectionism, nepotism, and abuses of official position.

The Kazakh SSR Academy of Sciences Presidium is slowly restructuring its activity in solving the most important scientific and technical problems.

This is the very incomplete, but, even so, sad outcome of the 12-year presidency. Alas, it was summed up only to January 1987, when the powerful protective field had already been removed from the academy.

About a year has passed since then. One of the then vice-presidents, Academician Gvozdev, signed the usual rehabilitating certificate of eighteen thick pages, which persistently advanced the idea that restructuring in the republic Academy of Sciences has already been accomplished. In a document stamped "For Official Use" to guard it from foolish eyes (more dangerous things are hidden behind the "Secret" or "Top Secret" stamp, to which the ordinary mortal has no access), it was admitted in undertones that three vice-presidents and the chief scientific secretary has been released "for purposes of overcoming protectionism."

One problem was solved.

However, three years later in December 1989, we must return to it again, because the sum has not changed due to the change of its components. Group favoritism and nepotism have not yet been eradicated, and the "gross" approach has not been overcome, in which a scientist is evaluated by the number of his publications, taking into account neither the discoveries and ideas contained in them, nor the degree of his personal contribution to science or participation in public life.

That is, there have been no changes at all, although Academician Gvozdev took the responsibility of claiming that restructuring had already happened three years ago.

Perhaps, the personal security measures devised by the System continue in effect, concealing not genuine state secrets under every conceivable stamp, but an aspiration to seek shelter from glasnost, from all forms of public control?

At The Iron Gates to the Cathedral of Science

It is no accident that the word "acceleration" is not firmly established in our political lexicon, although prerequisites for this were obvious and society had full grounds to more energetically leave its state of deadening stagnation. However, it did not leave, because there was precisely not enough internal energy, not enough social activeness to pull out of the quagmire.

The two decades of hard times (which can only be termed stagnation quite conditionally: All the "standing still" was actually movement backwards, but along a different track, draped with suitable slogans and demagogic) gave rise to unique phenomena.

Somehow, it imperceptibly became fixed in social awareness that an endless line of people, each surpassing the other in terms of intellect, competing (of course, not in a

direct sense) not for life, but for death, stands at the iron gates to the cathedral of science. However, as claimed in a number of certificates compiled in academic institutions, this concept became a stereotype long ago: The iron gates are no longer locked up, they are flung wide open, but no one goes through them.

Scientific research institutes take this legend for reality with great willingness: The people they are forced to admit for graduate study are, alas, not wonder kids, but how else can they fulfill the plan?

This is a paradoxical situation which, for the time being, no one is rushing to explain: Why do we need a plan, by which we must train people who have no talent for scientific and theoretical work? Who needs a plan that costs the state money, but gives nothing?

They claim it is necessary, since the training of highly skilled specialists is a state matter, and the fate of our Homeland depends on the development of scientific and technical progress.

If the shoe fits, wear it.

After all, the question is quite different. It is not about state programs for training scientific cadres, but about the planned admission into science of people who rarely have anything to do with real science. There is a diverse understanding of levels. Being guided by the planning principle, we long ago outstripped even the most highly developed countries in terms of the quantity, for instance, of shoes. Still, we remained barefoot. There are more scientific employees in Moscow alone, than in the United States. However, as far as economic progress is concerned...

Although, we have stopped mocking ourselves.

Let us not philosophize cunningly and take for the truth the idea, not very emphatically rejected, that not quite that which society acutely needs is occurring in science, due precisely to plan principles. Forecasting the training of highly skilled specialists really is a state matter. However, the problem lies in the non-state approach to it, which was asserted in the republic academy scientific research institutes.

Secrecy

It really would have been a tragedy, if the state of things appeared precisely as they depict it. However, in real life everything is entirely different.

There really is no competition in the academic institutes. However, this is not at all because talent suddenly ran dry in the people. Talented people do exist. However, science is not made better by this.

Only those, for who it is predetermined, pass through the wide-open iron gates into post-graduate study. So that they need not take risks, a most diverse technology exists, in which spontaneous contenders rapidly drop out

of the game. Such marking is more accurate than competition. A great many, if not everyone, long ago not simply guessed at such fine points, but knew them for certain.

For instance, here is an excerpt from an official document concerning the training of scientific cadres in republic Academy institutions: Requirements for the careful selection for post-graduate study of people who display abilities for scientific work are not being properly observed. There are cases in which casual persons are entering graduate school, who have no serious intentions of studying and defending a dissertation. In practice, admission to post-graduate study is conducted without competition. Only one-half of those admitted have undertaken scientific work.

Up to here, everything is clear. A fact is established and not refuted. Later, however, some not quite understandable escapades begin: ...of those entering post-graduate studies, a significant number have satisfactory scores on their diploma and on the entrance exams. The republic Academy of Sciences scientific research institutes, having no reserve in graduate studies, are forced (?) to admit their own associates, often insufficiently trained, who have no serious intentions of studying, to the vacant spots.

A supposedly serious institution compiled this document. However, it accepted the rules suggested to it with obvious willingness: Casual people were wandering the streets, unintentionally looked into graduate study at the Institute of Mining, and were accepted there.

Frankly, this is stupendous naivete.

If it is naivete in general, and not something far more original.

Tomorrow's Cadre Corps

In the republic Academy system, there are 31 institutions which train the highly skilled cadres, on whose shoulders responsibility for society's socioeconomic progress will be placed in 10 or so years. That is why the following troubled question is entirely legitimate: Is everything here favorable? Will we be traditionally doomed to the role of a unimportant country, whose superpower status is characterized by its space capability and fantastic weapons systems?

It is not worth exaggerating anything, yet even the official documents, usually well "weighed," do not evoke optimism.

Three years ago, at the first breath of restructuring, only 11 out of 129 graduate students defended candidate dissertations. The rest? It varied. Yet, they received a salary for all 3 years in good order. Precisely a salary, not some other form of payment. They did not study and did not work, being for some reason incomprehensibly supported at the state's expense.

In the old days, people who ate for free were called spongers. Today, this definition is insulting. However, there is no other word for it.

Work with graduating students, before letting them take entrance exams, is far more serious than work with future scientists. Public commissions should talk seriously with yesterday's 10-graders, elaborate on why they chose one or another VUZ [higher educational institution] or specific department, and get to the "heart," before making their recommendations.

The situation with tomorrow's cadre corps is the direct opposite.

For some reason, students graduating from the history department become graduate students at the Institute of Economics; from the microbiology and virology departments—at the Geographical Institute...

There is cause to sink into amazement.

After all, this is not an exception to the rules, but confirmation of them.

The argument is always the same, reliably approved by decades of stagnation: Over the course of many years, people enter graduate study in fact without competition, under the threat of disrupting the admission plan.

Graduates from the natural geography department, like the inadequate history teacher, having graduated from their VUZs with round "C's," were apparently predestined by fate to bring the economic and microbiological sciences out of a crisis state.

There are no standard statistics, even "for official use," concerning how much these bold experiments cost the state. However, there are various odd examples.

At the same Institute of Economics, only one of the 17 graduate students "defended" a dissertation. The outright loss is more than 50,000 rubles. The sum is less for microbiologists—about 20,000—but after attending the full term of graduate school, it was revealed that the people there were also "casual."

The game, however, continues.

The higher institution auditing the institute, instead of, as musicians say, arranging the syncope, recommends: Subordinate all efforts of the collective and the institute's director, Academician A. Ilyashev, to creating a scientific school of world significance.

Yet, that way lies mediocrity. There is nowhere to supply instruments. The doctors of sciences, having long ago reached rather venerable ages, are formally considered leading scientific associates, do not have even an approximate relation to graduate students; if to anything in general, although they also receive a salary regularly.

Why the slogans about world significance?

There is a similar practice in the Institute of Economics.

The fact that only one of the 17 who underwent graduate study became a candidate of sciences has already been noted. However, to put it frankly, even this one defended it thanks to a fortunate confluence of circumstances and desperate persistence. Here, it is "impolite" to discuss or substantiate even the subject area of dissertation work or plans for scientific research. In the best case, the theme is simply "talked over" with a scientific leader.

However, the most poignant part starts later on.

The official leader rarely even remembers the hair or eye color of his graduate student. All responsibilities related to teaching are given to yesterday's dissertation authors, who solve a whole set of problems.

Academician Ashimbayev has about nine such "graduate students," Academician Koshanov—four, etc. Yet, they are paid about 350 rubles per student for "guidance."

This is mentioned not to count the rubles in someone else's pocket, but just so that no one will think that the training of highly skilled specialists is based on social principles and costs the state nothing.

Who is Taking the Defensive?

The average age of today's candidate of sciences, working in the system of academic institutions, is 45 years. The state of the reserve is highly critical. Maybe it is just chance... Of the 16 chief specialists in the Academy, only one is under 50, and the rest are well over 60 or even 70 years. The average age of scientific subdivision leaders is 52 years. However, the most unusual thing, of course, is that the junior scientific associates are already over 40...

Of course, age is a very individual matter. However, it is nonetheless questionable that a junior scientific associate approaching his 50th birthday is still full of optimism and intends to energetically advance the technical and social progress of society.

The main point, however, is that in academic institutions there are already twice fewer leading scientific associates, who determine overall policy, than there are research subdivisions. In the Institute of Geological Sciences, there are only 10 leading associates for 37 independent laboratories, of sociology—one, of Uighur studies—neither chief, nor leading associates; in astrophysics—two for seven laboratories; in the Institute of Economics—four leading associates for eight departments, five sectors, and the center. The rest are incapable of training their own graduate students. Is it surprising, that our economy has an economic order, similar to this institution...

In short, the problem of training cadres is very acute.

Yet, who is taking the defensive, guarding his own interests from the interests of science?

There is someone who can answer this question...

Academician Gvozdev, recently released from the vice-presidency, managed in his day to assert the usual information, thus personifying not only his own view of reality: **Promising programs for training scientific cadres have been drafted in all scientific institutions up to the year 2000, and will be refined after approval of basic scientific directions in the institutes and after determining the requisite quantity of doctors and candidates of sciences in terms of specialties. The Kazakh SSR Academy of Sciences Presidium has considered the question of training cadres through graduate study...**

What will happen in this case?

Now, we are only beginning to guess what a critical situation we are in, what kind of morals were asserted over the years of stagnation in our "cathedral of science." In the future here, we must not exclude the most unexpected and sad revelations. After all, although the protective field has been removed, the stronghold of stagnation continues to take the defensive.

Just one piece of information, so as to avoid exhausting debate. In the last elections of corresponding members, a 29-year old doctor of mathematics, a highly talented scientist in the general opinion, suffered a crushing defeat.

There is no need to comment.

The Day to Come...

A person inclined toward original mental activity will think regardless of whether or not institutions, called academies or whatever else, exist in the universe. However, it is in the interests of society to unite scientific forces, to focus them on the main directions of socioeconomic progress, and to create all necessary prerequisites so that a gifted person, who understands the secrets of the universe uncommonly well, can create effectively. It is not worth rejecting a person for the sake of fashion, since breaking is not building. The world has already reached a level in which brilliant ideas, which as before sometimes visit mankind, now, however, cannot be implemented by one man alone. The invention of the wheel was extraordinary for the human intellect, but it turned out to be very simple to make. These days, a well-educated schoolchild knows the principle for controlling thermonuclear fusion, but for the time being no technical solution has been found, and it will not be discovered by one person on his own.

This is the center not of all, but of many contradictions.

Over the last three years, scientists in the republic Academy have been honored by nine USSR and KaSSR state prizes and 26 prizes from the councils of ministers. Its staff includes heroes of socialist labor, winners of the Lenin Prize, and honored workers in science. Each of them has made a serious creative contribution to theory and to the development of technical progress and culture. There is no reason at all to deny that which is.

However, it is also risky to claim that the Academy has become the flag-bearer for the restructuring of science in the republic.

It did not and does not live in a world isolated from society. That which was inherent in everything in the years of stagnation to a great extent also affected scientific institutions. This includes administrative subjectivism in the evaluation of certain scientists, unceremonious interference in the academy's strictly internal affairs and, at the same time, the release of its subdivisions from any responsibility for faulty decisions. This happened, for example, with the implementation of such an absurd project, as creating the Kapchagayskiy Water Reservoir or constructing the Semirechye "Eighth River."

Today, we look sadly at disfigured nature, trying as much as possible not to remember how many millions these "prestigious projects" have cost society.

The Institute of Hydrogeology and Hydrophysics, having created the "masterpiece of the century" (rumor blames it for genuine authorship; the technical and economic substantiation was not drafted by the Administrative Office, but by an academic institution, and it is time to get used to such responsibility), judging by everything, will never be left without work. First, its associates labored to spoil nature, and now they are forming a new scientific direction, in order to somehow rehabilitate themselves in the eyes of society. However, it goes without saying, once again for the usual many thousands of rubles...

Really, is the development of the Western Kazakh gas and petroleum region, accompanied by dangerous consequences for the surrounding environment and for man directly, taking place with less serious consequences today? Yet nobody has heard of any of the high-placed workers in academic science going into retirement as a mark of protest in connection with the ministerial barbarity being created.

This relates to the question of morality.

We are throwing up to 30 percent of raw materials into the Dzhezkazgan mines.

So much assorted mineral wealth has accumulated in the slag-heaps of Kazakhstan, that it is already greater than that in the prospected depths. Yet we cannot extract it. We do not know how, and that is that. There is no technology.

This also relates to the question of morality.

Three of our industrial workers, without taking quality into account, do that which one worker "over in Europe" can handle. In agriculture, this ratio is one to five. Of course, the point is not that people hammer nails three times faster or till the earth five times more quickly "in

the West." It is a question of equipment and technologies. Here, we have a hopeless lag, and world progress does not intend, it seems, to halt its development, while we catch up to its level.

This also relates to the question of morality.

In the Reactor of Stagnation

We have very low labor productivity and very high expenditures for the production of a unit of output. However, the republic academic science interferes in these vital matters least of all, evaluating its contribution to the development of socioeconomic progress by the number of articles and monographs, often far removed from science in reality.

The situation is somehow entirely incomprehensible to non-academic thinking: If it were based on economic effectiveness as calculated by academy institutions, we would be entirely able to compete with enlightened Europe.

In the opinion of the same Institute for Hydrology and Hydrophysics that left man-made rivers and seas for our descendants, the institute's economic effectiveness was 1.7 million rubles over the last 3 years. However, not a single kopek has been established by official expert analysis, not even for the expected future. True, there is a fair number of monographs—ten by count. However, not one of them has been published, for instance, at the Union level. The salary for institute associates has increased by a third over the last 3 years, while in fact the contribution has been zero. However, the institute's activity in this regard is demonstrated most energetically. For instance, Academician S. Mukhamedzhanov, despite all the woes of the director, is heading 18 subject areas simultaneously, one-third of the institute's entire work.

This is beyond the comprehension of a simple mind.

Discoveries in the republic academic institutions occur, even when nothing is happening there in general.

In a situation of total glasnost and the developing process of democratization, any lack of substantiation is very risky. So, here there are only facts.

The Institute for Experimental Biology received four authors' certificates over 20 years. The studies of new methods to accelerate selection work did not give results. One of its services, already traditional, was considered to be the breeding of the Semirechye breed of pigs. However, it has now been revealed that this is also a fiction, like the achievements of the hydrogeologists. The economic effectiveness of the breed, as defined by its creators, was contrived and farms have refused to raise it.

However, the Institute for Chemistry of Petroleum and Natural Salts has surpassed the scales—if not of all, then of a great deal—of its own alleged research. For five years here, they fabricated an economic effect of almost

100 million rubles "from application of a new technology for extracting high-paraffin oil—gradual thermal flooding, the use of an anti-loop device, and a methodology for exploratory work in a rotating drum."

This could send any ordinary fellow into holy trepidation, so, for simplification's sake, we offer the following information: The institute did not create any multimillion effect whatsoever, beyond its greatest achievement of 20 kopeks per ruble expenditure.

The administrative system is the only thing capable of reproducing this, not even striving for variations. We have been struggling against distortions in accounting and against figure-padding for as long as Soviet power has existed, since the very day we became state farm laborers, regardless of our posts. In the end, this farm-worker ideology cannot help but lead to a most acute social crisis. A delicate sphere like science in which, as it is acceptable to think, fanatics, people who have renounced this world, work, is no exception.

It is an ordinary myth, with which we must part, albeit sadly...

Today, the Institute of Metallurgy and Enrichment (the second part of the official name, in the literal meaning) serves as a classic example of the scale of white-washing. In four years, it has included among its achievements seven developments, supposedly already being used in industry with an effectiveness of 60 million rubles. Yet, the effect, it was revealed, is 700,000 rubles.

Another episode, in which the associates of this institution announced the application of two of their inventions at the Taldy-Kurgan Accumulator Plant, with an economic effect of 3.2 million rubles, turned out to be entirely fabricated.

These scientists were not even close to that figure.

This is how we have lived.

There is a whole series of outright deceptions, white-washing, forgeries, and cynical appropriation of already-known technologies. All this was well-known at the institute. However, without any embarrassment, the scientists accepted the Red Banner and 40,000 in bonuses...

It is a habit.

All the same, it was astounding when republic Deputy Prosecutor Myznikov (the air clearly smelled of a threat) made the following verdict with regard to a member of the USSR Academy of Sciences: ...The actions of the officials did not pursue mercenary goals, had no harmful consequences, and were of a prestige-related nature.

Such is the legal assessment of that which, even in the years of immorality and permissiveness, was categorized quite simply. Evidently, white-washing, estimated at tens of millions of rubles, is now not criminal, but prestige-related in nature.

That is the sad logic of perestroyka.

When the secret began to become obvious, it was stated correctly, but quite definitely, with regard to Vice-President S.M. Kozhakhmetov, who headed the Institute of Metallurgy and Enrichment, directly guided by the president himself: ...He failed to ensure proper control over the course of application, and reconciled himself to white-washing and figure-padding of economic effect.

Today, the former vice-president himself leads a formerly subordinate institute. Everything is in his own circle.

We will continue to live a strange kind of life, in a world of non-intersecting parallels. We will be unable to abandon of our own false concepts of it, dictated by the distorted ideology of the period of stagnation, not knowing how to exit its rigid structures and entirely inexplicable fantasies.

According to report data from the Institute of Nuclear Physics, in the course of past years 85 different developments have been introduced in the national economy with a general economic effect of 17 million rubles. This result was verified at a general meeting of the republic Academy of Sciences. Once again, the same story: 16.6 million of the mentioned sum turned out to be... conditional. The remaining 400,000 were a forgery in general: The acts turned out to be falsified. That is, no one ever introduced any developments whatsoever anywhere. It is all a myth. Or, if you listen to Myznikov, it is prestige.

With great difficulty, ecologists managed to shut down the nuclear reactor at the Institute of Nuclear Physics. However, the general radiation background around it and the absolute majority of other scientific research institutions of the republic Academy of Sciences remains excessively high. It is conditional.

However, very real deactivation is needed.

It is needed, because the reactor of stagnation continues to emit hard radiation.

KSSR Central Committee Discusses S&T Cadre Issue

907A0138A Alma-Ata KAZAKHSTANSKAYA PRAVDA
in Russian 12 Jan 90 p 1

[Article: "In the Central Committee of the Communist Party of Kazakhstan"; first paragraph is KAZAKHSTANSKAYA PRAVDA introduction]

[Text] The question of the selection, placement, and training of scientific personnel at the Kazakh SSR Academy of Sciences, in light of the decisions of the January (1987) CPSU Central Committee Plenum, was considered in the Central Committee of the Communist Party of Kazakhstan.

In the adopted decree it was noted that the presidium of the Academy of Sciences, the management, and the party

organizations of scientific research institutes had taken a number of steps in this direction. The management staff has been substantially renewed; the combining of positions is being eliminated in practice. After many years of stagnation the scientific councils have begun to declare themselves, and the activity of public organizations and independent scientific formations is being stepped up.

At the same time an efficient system in personnel policy has not yet been formed at the academy. The practice of the selection of the personnel, who are included in the nomenclature of the presidium, is being slowly reformed, as a result of which people, who do not know how to stimulate scientific creativity, lack initiative, and are incapable of waging a struggle for perestroyka, at times are getting into management positions. The procedure of electing new full members and corresponding members of the academy requires improvement, it lacks democracy and glasnost. Cliquishness and nepotism have still not been eradicated, the "gross" approach, when a scientist is rated according to the number of publications without regard for the discoveries and ideas, which are contained in them, the degree of his personal contribution to science, and his participation in public life, has not been eliminated.

In view of the failure to put in order the systematic admission to graduate studies and scientific research institutes of gifted young people from among the graduates of higher educational institutions and young specialist-production workers in strict combination with the retirement of associates and an active certification policy in the past three years the average age of doctors and candidates of scientists practically did not decrease. The requirement of the annual five-percent reinforcement of the academy with young personnel has not been met once. The Personnel Goal Program, which was formulated here for the period to 2005, does not take into account the need for the changeover from the financing of scientific institutions to the financing of themes of research, does not direct attention to the attraction of undergraduates and graduate students to scientific research and discoveries, and, therefore, is not yielding the desired results.

All this is affecting the level of both applied and basic research, their effectiveness, and the development of such priority directions of machine building, information science, robotics, instrument making, new materials, nontraditional energy sources, and biotechnology. Scientists of the academy have still not defined in earnest their position with respect to the problems of the preservation of the Aral Sea and the improvement of the air basins of Alma-Ata, Chimkent, Dzhambul, Ust-Kamenogorsk, and other industrial and cultural centers. The social sciences are being restructured slowly, social scientists are engaging too little in the study of the social phenomena that are natural for this stage of perestroyka.

The role of the departments of the academy in the determination of the themes and direction of research

and the strengthening of contacts with VUZ [higher educational institution] science and production has been belittled.

The material and technical base of the Academy of Sciences is weak; it does not have a broad network of scientific technical complexes, laboratories, and pilot experimental and design bureaus. The deadlines of the construction of facilities, particularly housing, are being upset. The supply with computer hardware and advanced instruments leaves much to be desired.

The Alma-Ata Oblast and City Party Committees and the Frunzenskiy Rayon Party Committee are not properly influencing the state affairs at the academy, first of all the selection, placement, and training of scientific personnel.

The Central Committee of the Communist Party of Kazakhstan directed the attention of the presidium of the Kazakh SSR Academy of Sciences (U.M. Sultangazin) to the serious shortcomings in the selection, placement, and training of scientific personnel in light of the decisions of the January (1987) CPSU Central Committee Plenum.

The presidium of the Academy of Sciences needs to eliminate the shortcomings, bearing in mind that the oversights in personnel policy are seriously affecting the further development of science, its contribution to the processes of perestroika, and the solution of the urgent socioeconomic and sociopolitical problems that face the republic.

The presidium of the Academy of Sciences jointly with the State Planning Committee and the Kazakh SSR Ministry of Public Education must revise the Personnel Comprehensive Goal Program for the Period to 2005, having envisaged the planning of the training of personnel with a breakdown by specialties subject to the amounts of financing of the priority directions of research and the orders of higher educational institutions, scientific institutions, enterprises, ministries, and departments and the expansion of the training and practical studies of young scientists at prominent scientific centers of the country and abroad. Proposals on the organization of an international youth educational scientific center on the basis of the corresponding scientific institutions and higher educational institutions of Alma-Ata and on the establishment of nominal stipends for graduate students should be prepared and submitted.

It was proposed to increase the efficiency of the work of affiliates of chairs of higher educational institutions at institutions of the academy, having resolved the issue of allocating a wage fund for the enlistment of highly skilled personnel in practical scientific work.

The communist executives and party organizations of institutions of the academy need to elaborate and implement specific measures, which are aimed at the radical improvement of personnel policy and contribute to the

stimulation of the fruitful work of young talented scientists, the increase of their vocational training, and the emergence of new practical and moral qualities. It is necessary to develop a mechanism of the interested participation in this work of labor collectives, scientific councils, commissions for problems, councils of young scientists, and public organizations.

Fundamental steps on the creation, training, and replenishment of an effective reserve of young scientists for promotion to management positions should be taken, the reports of executives on the training of the reserve should be regularly examined at party assemblies and meetings of scientific councils. The continuous study and consideration of public opinion on scientific personnel should be introduced in practice, haste in the settlement of personnel questions should be eliminated.

It is necessary to use actively new effective forms and methods of the training and selection of candidates for enrollment in graduate studies, by holding competitions for the enrollment of the most worthy candidates, to enlist full members and corresponding members of the Academy of Sciences more extensively in this, and to increase their responsibility for personal recommendations to those enrolling in graduate studies.

It is necessary to introduce in practice the regular examination at meetings of scientific councils and open party assemblies of the reports of the supervisors of graduate students and degree candidates on their personal contribution to the training of personnel and to provide a principled appraisal of the shortcomings in this work.

It was recommended to the Kazakh SSR Council of Ministers to consider the question of steps on the further increase of the effectiveness of research and the strengthening of the material and technical base of the republic Academy of Sciences, as well as on the improvement of the living conditions of doctoral students, graduate students, research trainees, and young associates of the academy.

The Alma-Ata, Guryev, and Karaganda Oblast Party Committees and the Alma-Ata City Party Committee were ordered through the primary party organizations of institutions of the academy to increase the influence on the selection, placement, training, and education of scientific personnel and on the creation of the production and living conditions for them. It should be seen to that meetings with scientific collectives and accountability to them would become a permanent norm and need of the executives of the Academy of Sciences and its institutions, and the necessary assistance should be given to academic institutes in the creation of and the work with the reserve of personnel.

Automation of S&T Research in Kazakhstan

907A0144A Alma-Ata *VESTNIK AKADEMII NAUK KAZAKHSKOY SSR* in Russian No 1, Jan 90 pp 5-7

[Article: "On the Status and Tasks of the Development of the Automation of Scientific Research at the Kazakh SSR Academy of Sciences"]

[Text] In recent years definite work has been performed in the area of the development of the automation of scientific research at the Kazakh SSR Academy of Sciences. Scientific research at 21 institutions of the academy is being conducted with the use of computer hardware. Here it should be noted that a quite high level of development of automated systems for scientific research (ASNI's) has been achieved at a number of institutions: the integrated ASNI for nuclear physics research (the Institute of Nuclear Physics), ASNI's in the form of elements of local computer networks (the Institute of Geological Sciences, the Institute of the Ionosphere, and the Astrophysical Institute), the development of problem-oriented databases (the Institute of Seismology and the Institute of Metallurgy and Ore Dressing), and the extensive use of mathematical models of objects of automation (the Institute of Mining and the Chemistry and Metallurgy Institute).

The Kazakhstan Regional Computer Subnetwork within the Akademset [Computer Network of the USSR Academy of Sciences and the Academies of Sciences of the Union Republics] of the USSR Academy of Sciences (the Institute of Mathematics and Mechanics), a system of the computer-aided design of technological processes of mining and chemical enterprises (the Institute of Mining), a system of the gathering and processing of seismological information (the Institute of Seismology), and various ASNI's (the Institute of High Energy Physics, the Institute of Nuclear Physics, the Institute of the Ionosphere, and the Institute of Metallurgy and Ore Dressing) are being developed in accordance with programs of the USSR State Committee for Science and Technology and the USSR State Committee for Computer Technology and Information Science.

A temporary youth creative collective attached to the Institute of Mathematics and Mechanics of the Kazakh SSR Academy of Sciences in two years put together and introduced six ASNI's at three institutions of the academy (the Institute of Mathematics and Mechanics, the Institute of Chemical Sciences, and the Institute of Linguistics).

Basic and applied research in a number of important directions of information science: The theoretical principles of the development of special computers, the theory of optimization and mathematical simulation, the theory of databases, and the theory of automatic control, is being conducted at the Institute of Mathematics and Mechanics, the Institute of Mining, the Institute of Hydrogeology and Hydrophysics, the Kibernetika Scientific Technical Complex, and others.

The Information Science Program of the Kazakh SSR Academy of Sciences for 1989-1995 was formulated by the Council for Automation, Computer Technology, and Scientific Instrument Making attached to the Presidium of the Kazakh SSR Academy of Sciences, a draft of the concept of the informatization of the Kazakh SSR was drawn up with the participation of the bureau of the Council.

The Kibernetika Scientific Technical Complex attached to the Institute of Mathematics and Mechanics of the Kazakh SSR Academy of Sciences and the chair of information science within the scientific educational complex (NUK) of the Kazakh SSR Academy of Sciences were established.

The formation of scientific technical cooperative centers at a number of institutions of the academy contributed to the speeding up of the development and the introduction of ASNI's. Thus, for example, the Spektr Cooperative Engineering and Technical Center introduced a program-controlled laser analyzer of aerosols at the Institute of Mathematics and Mechanics, an automated system of the processing of chromatographic data at the Institute of Organic Catalysis and Electrochemistry, and others.

The Second Republic Conference on Problems of Computer Mathematics and the Automation of Scientific Research was held.

The supply of the Academy of Sciences with computer hardware, particularly personal computers, is improving. Thus, in 1988, 63 computers were received, of them 30 were personal computers, in 1989, 110 computers, including a YeS 1066 computer and 102 personal computers, were received.

However, a number of unsolved problems exist in the area of the automation and informatization of the Kazakh SSR Academy of Sciences.

Only 20 institutes submitted proposals for the Information Science Program of the academy, moreover, many are planning only the automation of one scientific experiment.

In the majority of themes of the Ecology Program, the Complete Use of the Mineral Raw Material Resources of Kazakhstan Program, and the Man, Science, Society Program of the Kazakh SSR Academy of Sciences the stages of the work on their automation have not been planned.

Research in many important directions of information science (semiotics, theoretical programming, game and decision-making theory, the principles of the computer-aided design of new information technologies for the development of databases and knowledge bases, software products, and others) at the Kazakh SSR Academy of Sciences either is not being conducted or is being conducted very inefficiently due to the lack of a specialized academic institute.

Among the other shortcomings in the area of the development of information science it is necessary to point out the following ones:

- the Council is not fully implementing the scientific organizational measures which were stipulated by the Statute, such as the elaboration of recommendations on the establishment of new subdivisions and institutions, the travel abroad of specialists and their reports, the examination of dissertations, the regular holding of plenary meetings, and others;
- the questions, which are connected with the organization of joint ventures for the production of computer hardware, are being worked on not actively enough and without thorough analysis;
- the departments and the divisions of the staff of the Presidium of the Kazakh SSR Academy of Sciences are not devoting proper attention to the problems of the automation of scientific research and information science, complete cooperation between them and the Council does not exist;
- the scale and amount of work on the development of the informatization of the republic, which is being performed by institutions of the Kazakh SSR Academy of Sciences, do not satisfy the increased demands.

The Presidium of the Kazakh SSR Academy of Sciences stressed the exceptionally great importance of informatization for the success of perestroika and for the socio-economic and political life of Soviet society and the need for the further development of the automation of scientific research and information science at the Academy of Sciences as a priority direction of scientific and technical progress.

The new composition of the Council for Automation, Computer Technology, and Scientific Instrument Making attached to the Presidium of the Kazakh SSR Academy of Sciences was approved. The chairman of the Council is Vice President of the Kazakh SSR Academy of Sciences and Academician of the Kazakh SSR Academy of Sciences V.N. Okolovich.

The Council was charged to formulate the concept and a program of the informatization of the Kazakh SSR Academy of Sciences to 2000, the departments and institutions of the Kazakh SSR Academy of Sciences were charged to draft programs of work for 1990 on the complete automation of scientific research, including on the themes that have been included in the Ecology Program, the Complete Use of the Mineral Raw Material Resources of Kazakhstan Program, and the Man, Science, Society Program of the Kazakh SSR Academy of Sciences, with allowance made for the principles of new information technologies.

The Council, the Scientific Personnel Department, and the Institute of Mathematics and Mechanics need to formulate measures on the assurance of the training and

advanced training of personnel in the area of the automation of scientific research and information science.

It was recommended to the Physical and Mathematical Sciences Department and the Kibernetika Scientific Technical Complex to study the existing possibilities and the required amount of financial, material, and manpower supply of the Kibernetika Scientific Technical Complex for the active development of work on the preparation and implementation of the republic program on informatization.

The deputy president, the Council, and the Kibernetika Scientific Technical Complex were ordered to consider the possibilities of establishing a joint venture with the attraction of foreign firms for the production of scientific instruments, complexes, workstations, and local networks of workstations based on personal computers and local networks of personal computers.

The Presidium obliged the departments of the Kazakh SSR Academy of Sciences with the participation of the Council for Automation, Computer Technology, and Scientific Instrument Making to examine annually at their meetings the state of the work in the area of the automation of scientific research and information science and to take the appropriate steps on its improvement, having directed particular attention to the need for the tightening up of the coordination of activity among the subdivisions of the academy in this area.

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New President of LaSSR Academy of Sciences Interviewed

907A0138B Moscow *POISK* in Russian No 4 (39),
25-31 Jan 90 p 2

[Interview with President of the Latvian SSR Academy of Sciences Doctor of Technical Sciences Yan Yanovich Liyelpeteris, by *POISK* corresponding Vladimir Steshenko, under the rubric "An Interview on Taking Office" (Riga): "Your Choice, President"; date not given; first paragraph is *POISK* introduction]

[Text] Having won the election, which was held on an alternative basis, Doctor of Technical Sciences Yan Liyelpeteris, a prominent specialist in the field of magnetohydrodynamics, greeted the New Year as president of the Latvian SSR Academy of Sciences. He is 58 years old. He is a CPSU member and a Latvian and graduated from the Latvian State University. Magnetohydrodynamic units and technologies for the purification and process of mercury and the production of aluminum, which have been introduced in the USSR and served as the basis for the conclusion of 20 agreements with foreign firms, including of western countries, were developed under the supervision of Ya. Liyelpeteris and with his participation.

Regional Issues

POISK: Yan Yanovich, what, in your opinion, determined the choice of the General Assembly of the academy?

Ya. Ya. Liyelpeteris: I will state honestly that I had not particularly counted on success. I had a serious rival—Doctor of Technical Sciences Uldis Viyestus, a well-known scientist, who works in one of the priority directions—bioengineering. Perhaps, I succeeded in specifying more clearly the main problems.

POISK: Could you briefly tell the essence of our program statement?

Ya. Ya. Liyelpeteris: It is necessary to understand how our science was reduced to such a life not for the sake of fashion, but in order to make progress. It has found itself today in a difficult position both because of repressions and in connection with the fact that it has concentrated on narrow fields—defense and space, while the national economy has remained unreceptive to scientific and technical progress. The lack of advanced scientific equipment is also having an effect.

I am a realist and understand that you will not improve matters in a short time. Therefore, when addressing the General Assembly, I named as the main task the achievement of the dynamic stability of the development of science—in the sense of financing, material and technical supply, and the expansion of scientific cooperation both within the country and with foreign researchers.

These ties with the union republics are most traditional, close, and necessary. But in the West we must learn to earn foreign currency, by promoting the results of our activity. The foreign currency is needed for the acquisition of equipment and scientific business trips. In turn, these business trips are the quickest means of raising the level of young scientists. I have analyzed the age situation in science and have come to the unequivocal conclusion: If we do not attend now to young people, in about five to 10 years we will find ourselves in an even deeper crisis.

My proposals on the integration of academic and VUZ science and on the enlistment of undergraduates in work at our laboratories were also based on this analysis.

POISK: But what will prevent you from implementing your program?

Ya. Ya. Liyelpeteris: I do not know what I will do, if we do not solve the housing problem. Therefore, an entire block of my proposals concerns social issues—apartments, wages. For the present we intend during the next few years to build housing on our own, even by ignoring facilities of science. The weakness of the sectors that produce instruments is causing much anxiety. Therefore, we intend to organize our own production of scientific equipment. Of course, with respect to the products list we will not succeed in meeting all the needs. But we will establish a fund for exchange with other republics, while we will sell a portion abroad.

POISK: Will the economic sovereignty of the republic cause radical changes in the activity of the academy?

Ya. Ya. Liyelpeteris: Suggestions to redirect our attention only to regional needs are being heard. But I believe that we should preserve the already developed traditions, which determine the place of our academy in Soviet science. These are the development of medicinal preparations, moreover, the Institute of Organic Synthesis has made great gains, the development of new materials on the basis of various technologies (including uranium), and research in the field of magnetohydrodynamics, which is being conducted at a good, one could say, a world level.

At the same time the directions, which can be developed only in Latvia—Latvian philology and culture, the history of Latvia, and so on—will receive priority.

POISK: The Union of Scientists has been established in the republic. Is it your ally or opponent?

Ya. Ya. Liyelpeteris: I am myself a member of the Union of Scientists of Latvia. This is a major social force. To some degree the union is an opponent of the fixed approaches to the organization of science. Inasmuch as I am a supporter of a dynamic system, I believe that the democratic basis of the Union of Scientists of Latvia will help to solve better the problems that face us.

Latvian Scientists Union Studies Research Funding

907A0145A Riga NAUKA I MY in Russian No 2, Feb 90 pp 12-13

[Article: "How To Finance Science"; first four paragraphs are NAUKA I MY introduction]

[Text] The commission for questions of the organization and financing of science, which is engaged in the elaboration of proposals on the economic and organizational stimulation of the creative labor of scientists, operates within the Union of Scientists of Latvia (SUL). However, the urgency of the questions of the financing of science has increased in connection with the preparation for the changeover of the republic to self-management and economic independence; therefore, the opinion of the scientific community at large also had to be generalized and the principle of the financing of science under the new conditions had to be developed.

The concept, which was prepared by a working group of the commission of the SUL back in July 1989, is offered to the reader. A similar commission for the preparation of proposals on the restructuring of the system of the financing and organization of science was also established under the Academy of Sciences, which in collaboration with the SUL completed its work in October 1989.

The basic conclusions of both commissions are as follows: The financing of science should be carried out on a

competitive basis with the equality of all scientific collectives and organizations and should contribute to the uniting of the scientific forces of the republic.

The first steps on the implementation of these principles are already being taken. In particular, the basic legislative organ for science in the republic—the Latvian Scientific Council—is being established.

The Basic Principles of the Concept of the Organization and Financing of Science in Latvia

Knowledge and science as a whole are the unique property of society. The development of science and the increase of the amount of scientific information are an important prerequisite and criterion of the development of society itself. Science has practically unlimited potentials to improve the life of people and to promote the prosperity of society and at the same time to corrupt the individual, to destroy the diversity of culture, and even to bring mankind to ruin. Therefore, the achievement of understanding between science and society and the optimization of their relations are an important condition of both the development of science and the preservation and successful development of society. The intellectual and economic potential of Latvia are sufficient for science in the republic to be able to develop independently and to join world science as a fundamental component of it.

The present state of science in Latvia corresponds to the general critical situation in the economy and in the spiritual life of society. This crisis is appearing in the fact that: Science in Latvia thus far has not had any concept of its development; the national economy is not interested in the development of science and the use of its achievements; a discrepancy exists between scientific and scientific and technical results and the assets being spent on obtaining them; the prestige of science and education is declining sharply; the stagnation of organizational forms and the complete lack of the exchange and rotation of personnel are being observed in science.

All this indisputably testifies that it is necessary to change the principles of the organization and financing of science.

Here the achievement of the following goals is envisaged.

To ensure the intellectual sovereignty of Latvia, to develop the fields and spheres of science, which govern the existence of the sovereign republic as an independent state in Europe and the world.

To ensure the optimum development of the republic scientific potential, its updating and augmentation.

By economic methods to enlist science in the solution of important, urgent problems of society and the national economy.

To ensure the appearance of new knowledge and a high-quality scientific product.

Within the framework of professional ethics to implement the principle of intellectual competition as an important condition of the increase of the effectiveness of science and the maintenance of its prestige, the attraction of talented young people to science.

The real power of the people can be realized only when elective organs in the Soviets will be able to obtain the advice of scientists, which is independent of political and administrative supervision, and to rely on their opinions in all matters that interest society. It will be possible to overcome the domination of bureaucracy and to establish a law-governed state only on the condition of the existence of independent, humane, democratic science, which works in the spirit of cooperation and mutual assistance, in the interests of the people, and in mutual understanding with the power of the people.

The Organization of Science and General Supervision

The organization and management of science in Latvia should be based on the separation of the function of legislation, execution, and monitoring.

Scientists, whose rights are guaranteed by law, are the creative basis of science.

The creative group of scientists, which advances and implements its own research projects, which are provided on a competitive basis with assets, which are allocated by the state, individual organizations (including public organizations), or individuals, is the organizational basis of scientific work. Groups freely unite into other organizational forms (laboratories, departments, institutes, and others); specific functions and rights for the organization of common work are assigned to their management.

Every scientist or their group, which received state assets for the conducting of research, is a legal subject. All organizations of management and supply act as legal objects. Scientific organizations of all levels have the right to independent or common work and to the status of a legal entity, provided they have legally obtained assets for their research.

The republic Scientific Commission (NK) attached to the republic Supreme Soviet (VS) is the highest decisive organ. Highly skilled, authoritative scientists, who are actively working in science and who represent the basic directions and fields of science, are elected to the Scientific Commission (for a term of up to three years). A separate statute governs the formation of the Scientific Commission.

The Scientific Commission formulates the concept of the development of science in Latvia, national programs, and drafts of the budget of science, relying on the suggestions and opinions of the entire scientific community. The Scientific Commission works openly and in cooperation with society. The Scientific Commission evaluates the general contingent of experts and forms permanent expert councils (ES's) in different directions

of science. The expert council generalizes research proposals and estimates the necessary financing of individual directions of science or programs. For the evaluation of individual research projects the expert council organizes various expert groups, in which competent scientists, in necessary instances Soviet or foreign scientists, are enlisted.

The statute on evaluation, which is based on the principles, which have been adopted in the scientific world, of the preparation of scientific projects, their examination, generalization, and final evaluation, governs the activity of the expert councils and groups. The republic Supreme Soviet specifies the budget assets, which are allocated for science, by a separate line. The Center of Scientific Research (TsNI), which operates under the Council of Ministers, is the basic scientific executive organ. The Center of Scientific Research ensures the assimilation of the budget assets, which have been allocated to science, and forms and maintains its infrastructure (the storage, processing, and dissemination of information, collective-use centers, equipment rental bureaus, computer centers, supply organizations). The Center of Scientific Research organizes the necessary institutions on the principles of self-financing and bears responsibility for the technical, information, and social support of science. The Center of Scientific Research ensures the maintenance and development of the experimental base of scientific institutions of the republic.

The independent expert commission (NE), which is elected in a democratic manner from among scientists, is the highest monitoring organ. The independent expert commission evaluates the activity of the Scientific Commission and the Center of Scientific Research and systematically reviews the activity of the expert councils and expert groups. The evaluations of the independent expert commission are used during the reformations of expert councils and expert groups. The independent expert commission can form alternative expert commissions of individual projects and familiarize the Scientific Commission with the results of such expert commissions.

The Principles of the Financing of Scientific Research

The sources of the financing of science are:

- the state budget of Latvia;
- the assets of funds, which are formed by special-purpose taxes from enterprises and sectors of the national economy. They are used for the implementation of scientific research or programs, which are important for the region or the republic;
- various funds, which are formed by means of voluntary contributions of sectors, institutions, enterprises, cooperatives, public organizations, and individuals for the solution of important scientific problems of society or the stimulation of individual directions of research;

— bank credits.

Deductions for the USSR budget for the financing of science as a whole are not made.

The share of the national income, which is allocated for the financing of science in Latvia, should be greater than the same in developed foreign countries (for example, by the reduction of the deductions for military purposes). Only in this case does it seem possible to bring the level of research close to the international level.

Individual scientists, their groups, or organizations of other levels, the research projects of which have been approved by the expert council, are financed. The amount of financing is determined by the Scientific Commission in accordance with the suggestions of the expert council.

The state budget is the main source of the financing of basic science. The assets of individual organizations or funds can additionally be attracted. Applied research is financed mainly with the attraction of the assets of individual sectors, organizations, cooperatives, and individual producers. More comprehensive applied research projects are also financed by means of budget assets. The introduction of scientific and technical developments in the national economy is carried out on the basis of contracts with specific organizations at their expense. The procedure of the distribution of the profit is also specified by the contract.

The Scientific Commission develops and proposes methods of the economic stimulation of individual directions of science by means of the taxation system.

Economic methods and equivalent payment for the end result are taken as the basis of the financing of applied research.

The patent and license service of the republic is formed autonomously, on the basis of contracts with the corresponding international services. Patent legislation should be brought into line with the international system of the protection of copyrights. The foreign currency profit from the sale of licenses is left to the developers.

Publishing activity should be oriented toward the increase of the prestige of Latvian science and its popularization in the world.

At the same time the use of the Latvian language in science should be expanded.

The Training of Scientific Personnel

The training of highly skilled personnel is carried out on the basis of additional financing (stipends for doctoral studies, payment for practical studies, and others). The Scientific Commission can in addition finance institutions, which enlist undergraduates extensively in scientific work. The instruction at higher educational institutions should be organized in two cycles (in case of the training of scientific personnel, three cycles):

- the mastering of the basic syllabus in the chosen specialty;
- specialization in a specific field, which presumes individual scientific work;
- an individual final scientific study. After the successful completion of each system the corresponding scientific qualification—bachelor, master, doctor—is conferred. The best of those studying in the preceding cycle continue instruction in the next cycle. The scientific research during specialization is conducted at the base of scientific and production organizations (research institutes, design bureaus of plants, laboratories, and chairs) in close cooperation with the higher educational institution.

The undergraduate draws up independently a part of the syllabus and studies according to an individual curriculum, here its share increases from roughly 10-20 percent in the first cycle to 40-60 percent in the second cycle and to 50-80 percent in the third cycle. Instruction in accordance with syllabuses, which have been approved by the higher educational institution, is paid for from the state budget. Instruction in additional disciplines or instruction in accordance with a complete individual syllabus is paid for by the interested organization or private individuals. The instructors of higher educational institutions participate in scientific research work at their chair or at another scientific institution. Contracts for scientific teaching work at higher educational institutions are concluded with individual scientists or managers of groups of scientists (chairs).

The administrative and financial obstacles in case of the joint exchange of scientists and the more extensive rotation of personnel in both scientific and teaching work are being eliminated by the introduction of a system of contracts for the job placement of scientists and instructors.

When establishing new scientific organizations and reorganizing existing ones, it is desirable to form joint research institutes of higher educational institutions and the Academy of Sciences. This will increase the level of the training of young specialists, as well as the scientific potential of higher educational institutions.

Scientific degrees and titles are conferred by the scientific councils of higher educational institutions and research institutes. The system of degrees and titles is being brought into line with existing international traditions.

For achievements in science and services to society scientists can be admitted as full or honorary members to various scientific societies or public organizations. The procedure of admission is specified by their charter.

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Photoelectric Research in Uzbekistan Described
907A0130A *Tashkent PRAVDA VOSTOKA* in Russian
9 Jan 90 p 2

[Article by PRAVDA VOSTOKA science commentator S. Fioletov under the rubric "Scientific and Technical Progress—the Arsenal of Creation": "Amorphous Does Not Mean Poor"; first two paragraphs are PRAVDA VOSTOKA introduction]

[Text] Something common turned out to be between absolute order and disorder: Both can be useful. Moreover, at times the later can be to a greater degree than the former. This conclusion, which at first glance is paradoxical, follows from the work of two subdivisions of the Physical Technical Institute of the Academy of Sciences of Uzbekistan, which are dealing with semiconductor themes.

The charm of science in general and modern physics in particular also consists in the fact that the results of experiments often turn out to be so unexpected that they force one to revise carefully built concepts and models.

In 1975 at an international symposium on disordered semiconductors in Leningrad the most prominent specialist in this field of science, American G. Adler, stated categorically: Amorphous silicon will not present prospects for photoelectric power engineering. Life showed that this conclusion was incorrect. A year later a national program on energy problems, in which a leading place was assigned to amorphous silicon, appeared in the same United States. And the same Adler was one of its creators. In a kind of decade Cinderella had turned into a charming princess, in longing contemplation of whom many princes were lost.

Today in the world the production of photocells comes annually to 80 megawatts and 25 megawatts of them are photocells made of amorphous silicon. Even such a small country as Yugoslavia produces more than a megawatt of them a year. While the entire production of photocells in the USSR so far has been based on crystalline silicon and just a little on gallium arsenide. Incidentally, our lag in many fields of science and technology today no longer surprises anyone. In our case it is important to understand: why noncrystalline semiconductors became world-scale "grandees."

"Everything is very simple," Doctor of Physical Mathematical Sciences Yu.M. Yuabov, head of a laboratory of the Physical Technical Institute, believes. "Their properties proved to be so unique, while the production technology proved to be so efficient and reliable, that this could not but have attracted attention. In fact, this is the only semiconductor technology that allows complete automation of the technological process."

Paradox 1. Some 30 percent of the earth is made up of silicon. Apparently, they are infinite resources, which are so necessary for the production of all kinds of semiconductor instruments. However, this turns out to be a very expensive and difficult matter—one has to grow monocrystals and

polycrystals, from which one then has to obtain the necessary product. At the same Physical Technical Institute I had occasion to see how this is done. It is intricate and painstaking work: grow, then cut into the thinnest wafers, polish, then.... There is much else afterwards.

It is a completely different matter with amorphous silicon. The technology here is as follows: They apply the thinnest layer of silicon film from a special gaseous mixture to a base by means of a high-frequency discharge. It is possible to judge how thin it is from the following comparison: Whereas in an ordinary crystal the thickness is measured in fractions of a millimeter, here it is a thousandfold thinner.

Moreover, a different composition of the parent mixture is different properties of the films. It is possible to obtain, and there are already being obtained, multilayer structures. While these are field-effect transistors, solar arrays, and various other semiconductor instruments. In principle, it is now possible to transfer all items, in which crystalline semiconductors are now being used, to films made of amorphous silicon. For the consumer two indicators, which determine his choice, are important: the cost and the reliability. Today the production cost of one watt of installed capacity of such a film photocell is one-tenth as great as for a monocrystalline or polycrystalline photocell. While reliability goes without saying. And the bases can be most different, up to roll bases. And the area is absolutely not limited, you can produce entire "blankets" if you like....

As they believe at the Physical Technical Institute, and not only here, amorphous silicon is the only material today, which can meet all the needs of photoelectric power engineering.

Paradox 2. We ought to buy one plant for the production of noncrystalline semiconductors and that would be the end to it.

"In principle, it is possible," Doctor of Physical Mathematical Sciences P.M. Karageorgiy-Alkalayev, head of another laboratory of the institute, agrees. "But here is the trouble: Such a plant would not be cheap for the state."

Analyzing the work of Yuabov and Karageorgiy-Alkalayev, you are once more convinced: at times our merits, which after some time the entire world recognizes, ripen from our inherent shortcomings—poverty and poor management. In the history of our state it is possible to recall many examples that confirm this thought. And how was one not to conceive it, seeing how ecstatically the two well-known scientists tell where and how they extorted and got all kinds of pieces of iron, which are being transformed by their hands and the hands of their students into a technological line for the production of film photocells. Which, incidentally, are not inferior in quality to foreign analogs.

An example? By all means. There is an overabundance of them in the laboratory of Yuriy Mikhaylovich Yuabov. Here is the series-produced Elektronika microcalculator, into which instead of a solar energy converter based on crystals a film converter, which was developed at the Physical Technical Institute, is built. And close by is its

Japanese colleague. And although the one from across the sea is one block larger, ours generates the same parameters and operates just as stably even in case of very modest room lighting.

Here, on the laboratory table, are an electronic watch, a portable radio receiver..., in which film solar energy converters are used instead of small batteries and storage cells. Incidentally, the first three-chamber unit in the USSR and the technology for the series production of photocells, which were developed at the Fizika-Solntse Scientific Production Association of the Uzbek SSR Academy of Sciences, have already been turned over to the Foton Production Association. While today a five-chamber unit of a new generation, which is capable of solving problems of a significantly larger scale, has been installed in the laboratory of Yuabov.

In general film converters made of amorphous silicon in our sunny republic, as, incidentally, throughout Central Asia, can find the most extensive application. Power engineering, which is based on their use, is ecologically clean.

I cannot but tell about another section of the scientific research of Yuabov. The point is that the gaseous mixtures, from which the necessary layer of amorphous silicon together with hydrogen is applied to the bases, have many different impurities. How is it possible under these conditions to obtain reliable information about the quality of the final product? But there is no way—they do not produce the instruments for this in our country. The method, which is used in the production of crystalline semiconductors—the exposure of the wafers to a laser beam—is also not suitable.

And here Yuriy Mikhaylovich is finding an elegant and at the same time a simple solution, which is forcing scientists, who come to the Physical Technical Institute from other regions of the country, "to take off their hat" as a sign of recognition of the talent and persistence of their colleague.

I will not tire the uninitiated reader with a description of the complex formulas, however, believe me: This is actually beautiful and effective. The main thing is that the goal was achieved, the researchers obtained a reliable method of approximate analysis.

And still I left the institute with sorrow. This was not regret from parting with interesting, enthusiastic people. I can at any minute dial the necessary number and meet again both with Yuriy Mikhaylovich Yuabov and with Pavel Mikhaylovich Karageorgiy-Alkalayev. There was something else in this sorrow. It appears every time that I have occasion to write about the work of genuine scientists and to see all the faults of our imperfect economic mechanism, which is building all kinds of obstacles in front of talented developers. At times artificial ones, which neither the enthusiasts of science nor society as a whole needs. But...this is the theme of a separate discussion.

Supreme Soviet Deputy Supports GKNT, Cooperatives

907A0156A Moscow *POISK* in Russian No 7 (42), 15-21 Feb 90 p 3

[Interview with Doctor of Technical Sciences Professor Aleksandr Vladislavlev, first secretary of the Board of the USSR Union of Scientific and Engineering Societies and USSR people's deputy, by Yelizaveta Ponarina, under the rubric "A Topical Interview. Special Edition": "The Elimination of Illusions"; date and place not given; first two paragraphs are *POISK* introduction]

[Text] The announcement, which was heard last summer concerning the forthcoming All-Union Conference of Scientific Personnel, stirred many people. People perceived the idea of the conference as a congress of scientists and hoped that they would be able to voice all their resentments and suggestions to the highest executives of the country, first of all M. Gorbachev. Now it turns out that the conference is being held by the USSR State Committee for Science and Technology and a number of other departments. Will this conference not become just as fruitless shop talk as many preceding ones?

Today Doctor of Technical Sciences Professor Aleksandr Vladislavlev, first secretary of the Board of the USSR Union of Scientific and Engineering Societies and USSR people's deputy, answers this and other questions.

A. Vladislavlev: In your question the habit of placing trust in the wisdom of big chiefs can still be heard. It is good that the conference extended the framework of the meeting. Perhaps, this will make it possible to realize what component is lacking in the formula of perestroika. People are gathering at the conference during days, when the draft of the Law on Property has already been published and the discussion of the new party platform is beginning, which indicate fundamental transformations in the economic and political spheres. Today under these conditions the nature of the discussion on scientific and technical progress will be qualitatively different.

It must be understood that the Law on Property and the Law on Land will not be able to work, if the technological base is not ready: Without the proper equipment the farmer will not take much from the land and will not feed people.

No, perestroika is a revolutionary breakthrough not only in politics and the economy, but also in technology—the basic, end, and integral result of today's changes. In the end, if society knows how to make an advanced motor vehicle or other advanced equipment, hence, in society everything is in order. If it does not know how, expect revolutionary upheavals. We were incapable of doing this for all 70 years.

People might reply to me—What about Korolev, what about Kurchatov? Exceptions only confirm the rule, because completely unusual conditions were created for

these people, the entire country actually worked for them, and they did not know restrictions in anything. In essence, these were two, three, four, 10 outstanding entrepreneurs who supervised the most important national programs.

Therefore, it seems to me, it is necessary to place the problem of the technological revival of the country on the same level as the crushing of the monopoly of power and the crushing of the monopoly of property. After all, to what did the underestimation of the third component of perestroika—science and technology—lead? The people working in this sphere found themselves on the edge of reform. There is no demand for them. Lawyers, economists, and figures of culture moved into first place, while there were very few scientists of the technical level and industrial personnel among those setting the tone in the debates at the sessions of the Supreme Soviet. I expect that precisely this conference will identify them—those who in a manner equal to the requirements of the times could carry out the supervision of scientific and technical progress.

POISK: Again supervision.... Now the very idea of management "from above" raises doubt, statements, in particular, about the superfluous nature of the State Committee for Science and Technology under the conditions of market relations are being encountered more and more often in the letters of readers.

A. Vladislavlev: Oh, no. Even in the developed capitalist countries, where these market relations have been used in practice from time immemorial, the state regulation and management of scientific and technical progress exist. We are relying on it because we have fallen disgracefully behind in all directions. It is a matter not of the system of management, but of the fact that our economy is mortally ill. The diagnosis has been known for a long time: a lack of demand for the achievements of science and technology. They attempted to treat the disease with Stalin's senseless cruelty, the bustle of Khrushchev's organizational reforms, and the absolutely senseless political entreaties of Brezhnev. They examined the entire spectrum and, at last, understood that the principles of the economy should be changed.

After all, if I am a monopolist, there is no need for me to improve my product—they buy it as it is. This gives rise among professionals to a psychological inferiority complex: Undergraduates already know that talent, knowledge, and skill are not an absolute value in our country. They sense it all the more when they become engineers, scientists, and researchers. Therefore, among several generations of the technical intelligentsia of the Soviet Union the necessary quality, which is called enterprise, was completely atrophied.

Not only the manager and industrialist need enterprise, the scientist also requires it when he is organizing research and is developing an unusual machine. Therefore, if we want the spirit of enterprise to be reborn, we

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should adopt in the literal sense a law on the encouragement of enterprise or, at least, on the protection of enterprise. From this standpoint the concept, which was proposed by the State Committee for Science and Technology—and this is the concept of the "management from above" of scientific and technical progress—is absolutely powerless. It does not make our economy receptive to scientific and technical achievements.

We can accomplish this task only by means of the Law on Property, by means of the Law on Taxes, in which benefits will be granted to those who develop scientific and technical progress. Our task today is: to fill all the laws, which are under consideration by the Supreme Soviet, with the ideas of scientific and technical progress. If the conference were able to dispose the public to such an approach, this would be a conference of historical importance.

However, this does not at all mean that the country does not need such an organ as the State Committee for Science and Technology. It is needed, it should create the conditions for scientific and technical progress: stimulate innovations, competition, and the output of new products, carry out the coordination of international relations. But it should not engage in what it is engaging in today—in the specification of the priorities of scientific research. Because it does this on the basis of the internal logic of science. While it is not always linked with the problems facing society.

When specifying priorities today we should understand that we are not capable of making breakthroughs simultaneously in all directions. We cannot even in the 14 that have been declared by the State Committee for Science and Technology as priority directions. We must choose two or three which concern all of society. The State Committee should substantiate them, while the Supreme Soviet should approve them and earmark enormous allocations. It is necessary to concentrate all efforts on them and to prove to the Soviet engineer and scientist—to ourselves—that we can do something.

POISK: But are you certain that this will help to rouse researchers from lethargy?

A. Vladislavlev: I see with what enthusiasm many people have rushed to scientific cooperatives, to centers of scientific and technical creativity of youth, and to temporary creative collectives. Of course, shocking things and violations exist there, but the main thing is that many came there with their unrealized ideas. Therefore, today it is important not to hurt their hands and not to deprive them of the opportunity to affirm themselves and to express themselves. The majority of these engineers for the first time in their life have received an opportunity to implement their cherished development. Previously they could not accomplish this task within the framework of the bureaucratized, planned centralized economy, where monopolies of scientific schools and monopolies of design clans ruled. That is also why they rushed to independent scientific organizations. This is

obvious proof that it is time to change the "cornerstones" of our economy. What new principles should be firmly established?

In my opinion this is free labor, which is stimulated materially in complete conformity with its quantity and quality and is based on all—I emphasize—all forms of property that are known to mankind.

The second principle consists in the fact that our economy will be developed henceforth and from now on as a mixed economy: as an economy, which is planned in a centralized manner and is based on commodity-money relations.

The third principle is the principle of a strong social policy, that is, a policy oriented first of all toward the needs of man, not toward the integrity of political or scientific dogma. Roughly speaking, first feed, cure, and teach the population of the country, and then prepare for a flight to Mars. Now it seems to me that if our conference, which will bring together the cream of domestic science, were to proclaim these principles as a panacea for technological backwardness, we would make a significant contribution not only to the development of technology, but also to perestroika in general.

POISK: Is it worthwhile for the sake of this to strengthen the position of the technical intelligentsia—to return to the lap of the USSR Academy of Sciences the 100 technical institutions that were thrown out of it somewhere in the 1960's?

A. Vladislavlev: It is not worth returning by tearing sectorial science away from industry. It is necessary to make out of sectorial scientific research institutes, VUZ [higher educational institution] laboratories, and design bureaus, which exist at large firms and plants—all this applied science—an engineering academy. Because until engineering—the business of introducing results in production—finds its own headquarters, such as the large Academy is for basic science, it is impossible to expect that our engineers will emerge from the state of apathy.

POISK: What role do you assign in this matter to the Union of Scientific and Engineering Societies? It was probably not for nothing that it was among the organizers of the conference....

A. Vladislavlev: Not for nothing, because I am certain: Today in the country there are no more important tasks than the revival of the culture of public movements, which was branded with red hot iron. Only they will be able to oppose the monopoly of scientific schools and such central departments as the State Planning Committee and the State Committee for Science and Technology and the dictation of head scientific research institutes and design bureaus. And then to become an alternative to these state institutions.

Take, for example, the movement of the "greens." Today, while it is based mainly on emotions, blow after blow is being struck to the economy. We cannot built

nuclear plants, chemical works, and so on. Of course, it is necessary to remove the country from the zone of ecological disaster. But it is necessary to do everything in a thought-out, optimal manner. The state will at any moment be threatened by the most severe shortage of drugs and paper to a significant degree because the "greens" are deaf to any arguments of official organs. Yes, confidence in the latter has been undermined. But who will become the mediator between the "green" movement and the state? Whom can both sides trust? Public organizations, which unite professional scientists of the highest class.

These organizations can introduce in the dispute the competence of knowledge and enlist in an independent examination specialists from the most prominent Soviet scientific centers and even from abroad. And obtain as a result the optimum solution.

Such a thing is being practiced abroad and such a thing existed in Russia. Our country was famous for self-sacrificing public organizations. Professors, academicians, engineers, industrialists, and designers became members of professional societies. It was considered to be of the greatest prestige to participate in them. D. Mendeleyev made his first report on the periodic table of chemical elements precisely at a meeting of the Chemical Society. Moreover, engineering organizations in the world now also frequently play the role of advisers of the government.

POISK: Does it turn out that you are repeating what existed at one time?

A. Vladislavlev: We are not repeating it, but are reviving it.

POISK: And does the union have many primary organizations?

A. Vladislavlev: More than 140,000. Imagine what an enormous force this is. Neither the State Committee for Science and Technology nor some other scientific department has its representations everywhere, down to enterprises. I do not want to say that this concern of scientific and engineering societies has already gained strength. It is only gradually awakening, but after waking will develop into a most powerful organization which will strongly press the monopolistic state organ that the State Committee for Science and Technology is.

Many organizations, which today have been established or are being established in the system of the USSR Union of Scientific and Engineering Societies, will, of course, perish. Either in the struggle against bureaucracy or in the struggle against incompetence or under the influence of the unscrupulousness which exists there. But those that hold out, I am certain, will create models of the truly advanced, well-operating and efficiently operating enterprises in the sphere of science, technology, design, and planning, on which our economy can rely.

Letters Comment on Problems of Soviet Science

907A0155A Moscow *POISK* in Russian No 7 (42),
15-21 Feb 90 pp 4, 5

[Article under the rubric "What Is Science To Be Like? Special Edition": "On the Scale. A Dialog With the Reader"; first paragraph is *POISK* introduction]

[Text] When inviting the discussion of the problems of domestic science (*POISK*, No 12, the article of President of the USSR Academy of Sciences Academician G. Marchuk), we could not have even imagined what a barrage of ideas, opinions, and recommendations would fall upon us. Hundreds of letters were delivered to the Presidium of the Academy of Sciences and to the editorial board. We have managed to publish a portion of them, the other awaits its turn in proofs. A significant portion of the suggestions of scientists served as the basis for the survey which today, on the eve of the All-Union Conference on Scientific and Technical Progress, we are offering to your attention.

Measure Seven Times

There was not one letter, in which doubt was expressed about the necessity of the examination of scientific and national economic projects. However, a clear idea of the mechanism of their implementation is lacking. For example, Corresponding Member of the USSR Academy of Sciences V. Dzhelepov believes that "commissions of the extradepartmental system of scientific examination and forecasting in the basic directions of basic science should be based at the Academy of Sciences, but encompass all institutions that are engaged in basic research." Academician N. Solomenko sees the goals of these formations "in the organization of long-range (20-25 years) scientific forecasts of the development of science and technology." Associates of the Institute of Philosophy disagree with him: "A complex long-range forecast is incomprehensible. Perhaps, instead of it less ambitious documents, which, in particular, annually give data on the most promising fronts of research in world science, on the social priorities of the USSR and our possibilities here,...are needed.

"Moreover, a humanities examination of social technologies is necessary. This would prevent the adoption of a number of inadequately considered ukases and laws."

Corresponding Member S. Ivanov advises "to enlist leading foreign scientists in the examination of all programs. It is a matter not so much of their great competence as of the absence of a mercantile interest in our scientific measures. Here it is no worth being afraid to spend on an examination a year and 1 billion foreign currency rubles—Chernobyl, the Aral Sea, burning submarines, and the purchase of new technologies cost us tens of fold more."

Here it is difficult to say anything in reply, it is possible merely to add the words of Academician B. Petrovskiy: "One must not divide science in basic, VUZ [higher

educational institution], and sectorial science—fundamentality is determined by the idea of a study, its novelty, theoretical substantiation, and conclusions, which reveal the means of progress...." While the USSR Ministry of the Radio Industry, having actively joined in the discussion, proposes "to regard as the basis of the integration of academic, VUZ, and sectorial science the formulation of comprehensive programs from research to the development of equipment and technologies."

The whole question is, who will be able here to assume the entire burden of the organization of such a matter? In the structure of our research institutions, many people believe, an Academy of Technical Sciences is lacking. Here is what Academician L. Tauson and Candidate of Technical Sciences V. Netes write about this: "In our country there is no unified system of sectorial scientific institutions that are responsible for the solution of engineering and technical problems. The USSR Academy of Sciences itself can in no way be responsible for scientific and technical progress, for basic science, to use the words of Max Born, perceives what is new, while engineering, that is, sectorial technical science, makes what is new."

Of course, there were many different suggestions on the RSFSR Academy of Sciences. But, considering that it is already at the stage of formation, we will tell about it in detail in other publications.

What Is in Place of the Order

The giving of orders to science by directive organs, which are insufficiently competent in it, Corresponding Member S. Ivanov believes, is the source of the low level of our science. This applies first of all to the selection of management personnel—the directors of institutes, the heads of departments and laboratories. At best these are efficient organizers, not researchers.

"The increase of the status of the scientific supervisors of research programs and projects and the assurance of their independence not only in the solution of scientific problems proper, but also in the settlement of personnel, financial, and other questions can counter their influence," Corresponding Member G. Osipov believes. "And also the recognition of the scientific council as the highest collective organ, which settles all basic questions of the strategy and tactics of the scientific activity of the institute, and not as a consultative organ attached to the director. It is time to eliminate from the charter of the USSR Academy of Sciences the articles which attach to the executives of scientific research institutes the right of one-man management. This provision, which is typical of army regulations, gives rise to authoritarianism and monopolism in science."

Accordingly it is also time to revise the charter of scientific research institutes. The USSR Union of Scientific Personnel can make its contribution here. Many people support the idea of its establishment as absolutely necessary for the democratization of science.

The collective of the Institute of Structural Macrokinetics of the USSR Academy of Sciences, and not it alone, proposes very categorically to reorganize the system of election to the USSR Academy of Sciences. For example, to conduct the election of corresponding members with the participation of doctors of sciences (with deciding voting power). Moreover, to conduct the nomination of "electors" in the scientific councils of institutes. But President of the Estonian SSR Academy of Sciences K. Rebane in general believes that for the sake of the democratization of intra-academic life it is worth eliminating the two-level system of Academy membership.

Perhaps, such recommendations are not to the liking of everyone, but democracy presupposes the expression and publication of alternative points of view. The trouble is only that it is difficult to accomplish this.

And there are a large number of reasons here. Professor N. Prokhorov names one of them: "The slowing of scientific and technical progress is due to a large number of low-quality textbooks, monographs, and articles. Such a situation developed as a result of the mass suppression of critical statements in scientific journals." Knowing this from his own bitter experience, Doctor of Technical Sciences N. Khvorostenko proposes to combat monopolism in science in a specific manner: "In all journals of the system of the Academy of Sciences to introduce discussion rubrics, for which an independent editorial board made up of scientific collectives would select materials."

While Corresponding Member B. Dzhelepov advises altogether "to dissolve the scientific publishing council of the USSR Academy of Sciences. To divide journals by narrower directions of science. To increase the publication of scientific monographs, and to transfer the functions of the selection of manuscripts and the establishment of the procedure of their publication to the departments of the Academy of Sciences." We are not certain that the latter will not intensify monopolism in science.

However, all these are old ailments. The new diseases, which threaten domestic science with feebleness, have not yet been noticed by everyone. Corresponding Member Yu. Pariyskiy recalls them. He talks about the most acute information famine, which is leading to large economic and moral costs. "The quickest hookup of major sources of primary information to computer networks with advanced base computers is necessary. In strategic plans it is necessary to envisage the trend to transfer all scientific express information to computer media with the direct access of all users."

Knowing how such questions are being settled in the world, the Institute of Russian Literature of the USSR Academy of Sciences recommends "to establish immediately a joint Soviet-American venture—an information and bibliographical center, to carry out the computerization of librarianship."

Headquarters, Workshop, Temple?

As a whole scientists picture the role of the Academy of Sciences as a proving ground, where various means and hypotheses, as well as different forms of the organization of scientific work are tested. For example, Academician A. Ugolev proposes to compare the efficiency of large and small (which are successful in the FRG) scientific units and even autonomous laboratories (as in France). While Corresponding Member Ye. Karus "would limit the functions of the Presidium of the Academy of Sciences to organizational, financial, and social assistance to the scientific units of the Academy of Sciences."

Corresponding Member D. Zhimerin evaluates from his own point of view the efficiency of the use of scientific developments. He believes that "already in the process of basic research it is necessary to maintain constant contact with the potential user, to organize joint collectives made up of associates of the Academy of Sciences and industrial enterprises." In short, it is a question of changing over to flexible scientific structures, associations, and temporary collectives with the use of leasing joint stock forms of the shifting of the scientific research and pilot experimental potential.

In connection with this the Armenian SSR Academy of Sciences believes that it is time at academic institutions to permit the leasing contract, cooperative formations, and other advanced forms of the organization and remuneration of labor. Is it perhaps time to establish an Association of Scientific Cooperatives, which would assume the functions of the coordinator of interaction with the USSR Academy of Sciences?

Similar suggestions for the present are perceived hostilely by the scientific community. There are a handful of people whom cost accounting in science did not scare off. But there are those, who are literally prepared to sing it an ode, and do this sincerely. Candidate of Economic Sciences V. Morozov of Sverdlovsk writes: "I am glad that at last scientific knowledge and the forms of its practical implementation have begun to be recognized as a commodity. And since this is so, science can act as the seller of such a commodity, striving to get it a little more cheaply and to sell it at a little higher price. And, having derived dividends, it can finance itself in the future." Let us interrupt this letter for a minute and cite another opinion, the opinion, it can be said, of the overwhelming majority. "The changeover of basic science to if only even partial cost accounting can be an obstacle in its development."

"A gloomy future?" V. Morozov throws himself into the battle. "But during the preceding years, when all science was supported by the state, practically without being responsible for the utility of its results, did our society really forge ahead along the path of world progress? I am inclined to believe that the notion of cost accounting only as a means of the immediate sale on the market of a produced commodity is evidence of the tremendous economic illiteracy of the population, whose concept of

commodity-money relations was formed from the experience of visiting the Riga Market in Moscow."

"I believe that cost accounting will make inexpedient the artificial division into applied and basic science and will undermine the foundations of the existence of the four departments that manage it—the State Committee for Science and Technology, the Presidium of the Academy of Sciences, the State Committee for Public Education, and the sectorial scientific councils of ministers, having developed into an all-union association or network of regional, independent, cost accounting scientific institutions, which are formed voluntarily from below."

And still the supporters of Academician L. Tauson tip the scales in the dispute. In his opinion, "the base fund of the institute should be allocated from the state budget by basic directions. It is wise to determine its amount on the basis of the calculation of the spending per associate. (So that, judging from finances, using the words of Academician of the Ukrainian SSR Academy of Sciences G. Pisarenko, a Muscovite would not be fivefold 'more intelligent' than a Kievan.) Plus the assets from the 'pocket' of the State Committee for Science and Technology, the State Planning Committee, and the councils of ministers of the union republics for the filling of state orders. One should obtain them on a competitive basis. Moreover, it would be possible to contend for assets through international projects. And only then is there money for the sale of the output of one's own pilot works and in accordance with economic contracts. For owing to the low professionalism, egoism, and mercantilism of the management staff of enterprises these amounts will be negligible."

Here, of course, grants—a unique chance for success for young people and little-known researchers—merit special attention. Unfortunately, their use in practice for the present is small. But, looking ahead, the Tajik SSR Academy of Sciences warns: "Under the new conditions of financing a large number of approaches to the solution of one problem are required. Only in this way will it be possible to avoid monopolism and exorbitant prices. Competitiveness is necessary not merely for the sake of obtaining better financial support, but first of all for the sake of achieving better results."

A Homeless Candidate

"The question of the integration of academic science and higher educational institutions, the establishment of joint universities and institutes, scientific, introducing, and service centers: scientific and technological pools of equipment, the mobile exchange of personnel, merit special consideration," President of the Estonian SSR Academy of Sciences K. Rebane insists. Associates of the Institute of Russian Literature agree with him. But they advise also to strengthen the contact with school education. To abandon the mandatory nature of universal education in the secondary school and the trend toward

the decrease of the initial number of undergraduates. To coordinate better the syllabuses of schools and higher educational institutions....

But what then? For the most persistent people there are graduate studies. True, associates of the Zoology Institute of the USSR Academy of Sciences note, it is necessary to consider that given a salary of 175-200 rubles after the defense of a candidate dissertation it is difficult to expect an influx of capable people into science.

However surprising, in the letters there were nearly no ideas which specify the norms of the copyright in science. But it seems to us that V. Netes expressed them splendidly: "Working conditions, which correspond to those formulated in the international charter of scientific personnel, should be established by legislation for scientific personnel." But in connection with the publication of the draft of the Law on Pension Security there is much bewilderment. Candidate of Economic Sciences I. Kulesh of Irkutsk believes that one must not tie the hands of the people of intellectual labor, who determine the development of science and technology: Why, one would like to know, is the total amount of the pension and wage limited to the maximum amount, from which the pension has been deducted? For workers and foremen all the restrictions on the payment of the full pension are being lifted. Let us note that this is given the fact that the average wage at institutes of the Academy is 150 rubles less than for the country as a whole. "Candidates of sciences," we come across in the letters, "receive as much as drivers of buses, while doctors of sciences can only dream of the wage of a bulldozer operator of the Ministry of Land Reclamation and Water Resources." How can there not be a "brain drain" here?

Yes, people are already even ashamed to talk about the wretched wage of scientists of the system of the Academy of Sciences. It is so much more surprising to encounter it among young people who hold science above all else. For their sake Corresponding Member Ye. Aleksandrov reasonably proposes "to abolish the minimum requirements for a candidate degree—the existence of a dissertation work, which has been recognized by an expert commission and public opinion, is sufficient for the determination of skills. Instead of a handwritten dissertation it is necessary to do as they do in France—to legitimize one enlarged author's abstract of published articles."

But those, who have still been forced to pass the "minimum requirements," insist: "It is time to eliminate immediately the mandatory examination on philosophy for nonphilosophical specialties. It developed long ago into a rigorous test and oath of allegiance to ideological conformism."

But all these are trifles as compared with the shortcomings of the material and technical base of science and the instrument supply of basic research. "Both should be done," Corresponding Member D. Rundkvist writes, "if only so that scientific associates would not be destitute

and could engage in genuine work. And I would begin the changes by affording every scientific worker access to duplicating equipment."

"One should envisage special allocations for the acquisition of expensive scientific equipment, including for foreign currency. The assets, which are earned by institutes in international projects less the minimum tax, should become its source," representatives of the Oceanology, Atmospheric Physics, and Geography Department of the USSR Academy of Sciences believe. At the same time several people propose to establish tax breaks on the income of scientists in foreign currency, if they are used for production needs—computer hardware, scientific literature, instruments, and so forth....

"The need for the establishment of a system of the leasing of expensive equipment or its use on a cooperative basis has been spoken about for many years," they recall from the Tajik SSR Academy of Sciences. "It is necessary to orient the hypothetical fund of basic research on this level toward the practical experience of the U.S. National Science Foundation, which is actively promoting the establishment of centers of the leasing of complex and expensive equipment, which is regarded as a 'national resource.'"

"The process of the establishment of unified international science is taking place in the world. It is impermissible to be outside this process. Here we need to acquire professionalism without delay: to enter into direct ties with foreign colleagues and to appear on the international scientific market. A long-term state program of international ties, when the development of science is not confined only to the domestic production environment and to the economic return within the state, is needed," Academician I. Gorynin declares. Rector of Biysk Pedagogical Institute K. Koltakov literally echoes him: "It is necessary to establish a state fund of international cooperation in the development of science so that every scientific research institute and every higher educational institution, particularly the outlying higher educational institution, would have the opportunity to establish and develop contacts with scientific centers of other countries."

It would be a good thing, but everyone knows: The expansion of contacts is coming up against the lack of foreign currency. However, a practically free channel of contact exists—correspondence. True, an air mail letter takes a month and more to get from Europe to Moscow. The practice of delaying mail, which is equally senseless and compromising, to a significant degree devalues contacts by wrecking a large number of initiatives. It is proposed to raise before "competent" organs the question of eliminating the checking of the correspondence of scientists.

It is possible to say that representatives of the Armenian SSR Academy of Sciences expressed a common idea, which is contained in all the letters from the republic academies of sciences: "It is necessary to grant the

republic academies complete independence, which should include the questions of scientific planning, financing, the search for assets for scientific activity, the organization and elimination of scientific institutions, the training of personnel, election to the Academy of Sciences, the conferring of academic degrees and titles, and the establishment of contacts with foreign scientific centers."

It is possible to add to these words a remark from the Azerbaijan SSR Academy of Sciences: "In all the expert commissions of the USSR Academy of Sciences, the State Committee for Science and Technology, and others, which examine programs and the financing of scientific research and experimental design development, it is necessary to ensure the representation of the republic academies."

What conclusion suggests itself after familiarization with this collective reflection by correspondence of scientists? Today there are more problems than there are ready-made formulas. In short, the need for fundamental changes has arisen, a change of the attitude of society toward science and its representatives is also urgently required. Without this the intellectual development of the country is impossible. We will hope that during the days of the All-Union Conference scientists will succeed in finding the correct solution of this difficult problem.

Official Foreign Travel Requirements for Scientists Discussed

907A0147A Moscow *POISK* in Russian No 5 (40),
1-7 Feb 90 p 7

[Interview with Sergey Markianov, chief of the Main Administration of Foreign Relations of the USSR Academy of Sciences, by *POISK* correspondent Dmitriy Gvozdev, under the rubric "Details for *POISK*": "The Simpler, the Better"; date and place not given; first paragraph is *POISK* introduction]

[Text] The Presidium of the USSR Academy of Sciences has approved a new procedure of the drawing up of documents for going on foreign scientific business trips. At the request of our correspondent Dmitriy Gvozdev, Sergey Markianov, chief of the Main Administration of Foreign Relations of the USSR Academy of Sciences, comments on this decision:

S. Markianov: In the past four years the number of Soviet scientists, who have been sent abroad, has increased by more than 2.5-fold. I will cite figures: Last year along the lines of the USSR Academy of Sciences 11,000 specialists visited capitalist and developing countries (in 1985, 3,600 did), while more than 10,000 visited socialist countries. Contacts have been expanded, but the registration of departures for academic institutes as before required a large number of documents. Now everything has been simplified.

POISK: What documents should an institute submit for its associate?

S. Markianov: First, a written declaration for foreign travel signed by the director of the institute. The position of the associate, the country of departure, the duration of the business trip, the goal of and reasons for the trip, the source of financing, and the date of departure are indicated in it. This document reports the existence of a technical assignment (a plan of the business trip) and the reaching of an agreement on the recommended candidate with the party, trade union, or Komsomol (for All-Union Komsomol members) organization.

Moreover, two copies of a certificate with a brief indication of biographical data (place and year of birth, education and specialty, party affiliation, membership in elective organs, labor activity, marital status) with a note that there is a certificate from an attending physician, which is now valid for a year (concerning the absence of medical contraindications for travel abroad), are required. It is not required to submit the certificate itself. While previously a person even for a comparatively short trip needed to get through an entire medical commission. Photographs for a foreign passport and the obtaining of a visa are also needed. And that is all. Thus, in addition to the medical conclusion the autobiography and the reference have been removed from the departure file.

POISK: As is known, the slowness of registration has provoked reproaches on the part of scientists.

S. Markianov: Until recently the USSR Academy of Sciences was forced to confirm both long-term and short-term plans of trips in the State Committee for Science and Technology. This committee established for us strict limits on the number of people leaving with a "breakdown" by countries. Our specialists were invited to some foreign measures only two to three months before their start. The Main Administration of Foreign Relations with the best will in the world did not manage to get through with registration on time. As a result there are the bitterness and disappointment of those invited and the loss of prestige of the state in the eyes of the international scientific community. While we took the "lumps": In the eyes of scientists precisely we looked like bureaucrats.

By a decree of the USSR Council of Ministers of 16 August 1989 the USSR Academy of Sciences was granted the right to make independently the decision on the departure of specialists on official foreign business trips. At the same time the performance of consular functions, which are connected with the registration of foreign passports and exit visas, was also assigned to the Academy. For these purposes the Department of Foreign Passports and Visa was organized at the USSR Academy of Sciences. Now we apply independently, bypassing the USSR Ministry of Foreign Affairs, for a visa to the embassies of capitalist and developing countries (visas are not required for travel to socialist countries). We make out ourselves general civilian and service passports. However, the period of the presentation of documents still remains long due to the lengthy time of the

obtaining of visas, which has been established by a number of foreign countries (the United States—21 days, Brazil—90 days, Great Britain—21 days, Ireland—30 days).

I want to note that the academies of the union republics can go to foreign embassies through their permanent representations attached to the USSR Council of Ministers. Academic centers (for example, the Leningrad Center), which are located in cities where there are consulates-general, can obtain foreign passports directly at them.

And, what is the main thing, the republic academies and the Leningrad Scientific Center have been granted the right to make independently decisions on foreign business trips of their scientists. The question of analogous powers of the regional departments of the USSR Academy of Sciences is now being settled.

POISK: But does such a "restraining factor" as the lack of convertible currency remain?

S. Markianov: The USSR Academy of Sciences today is a member of more than 200 international organizations and has concluded over 50 agreements with foreign academies and other scientific institutions. Moreover, more than 40 interstate agreements on scientific and technical or cultural and scientific cooperation are in effect. Trips through these channels, as a rule, are made on the basis of noncurrency exchange with a number of people being sent on both sides, which is stipulated in the agreements.

The sending of Soviet scientists abroad for a long time outside of interacademy agreements should be carried out, as a rule, on the basis of a contract between the institute and the receiving party. The decisions here are made directly by the institutes. They also have the same powers with respect to trips of associates within the framework of interinstitute agreements on scientific cooperation. The revenues from the sale of licenses and the activity of joint ventures will contribute to the broadening of international scientific ties.

Moreover, in recent times we have begun to make more extensive use of foreign science foundations, which are willing to finance the practical studies of Soviet specialists abroad, first of all young researchers.

It seems that all these steps will to some degree contribute to the shift of the international relations of the USSR Academy of Sciences to a new qualitative level, which conforms to the present trends of the development of integration processes in world science and the more active involvement of Soviet scientists in these processes. For many scientists not without reason regarded the former barriers and restrictions as humiliating for themselves.

Apparently, the present mechanism of scientific contacts is also by no means ideal, there is something here to work on. For this purpose the council for international scientific ties, which Academician I. Makarov, chief scientific secretary of the Presidium of the USSR Academy of Sciences, will head, will be established at the USSR Academy of Sciences. The council will organize the formulation of the policy of the USSR Academy of Sciences in the area of international scientific ties and contribute to the increase of their effectiveness.